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ESSEX INSTITUTE.

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CHAPTER V.

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POSSIBILITY, DUTY, AND MEANS,

OF

OBTAINING AND KEEPING IT.

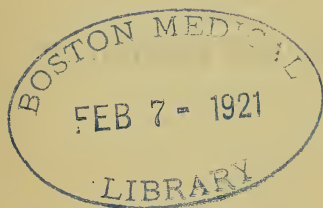
"The excellency of knowledge is, that wisdom giveth life
to them that have it," ECCLES. vii. 12.

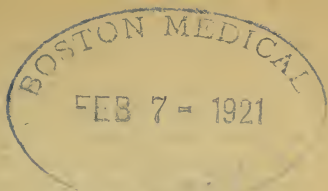
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GOOD HEALTH:

THE POSSIBILITY, DUTY, AND MEANS OF
OBTAINING AND KEEPING IT.

CHAPTER I.

INTRODUCTION.

SANITARY SCIENCE—LEGISLATIVE MEASURES ALONE INSUFFICIENT—INDIVIDUAL EFFORT REQUIRED—SCOPE AND DESIGN OF THE PRESENT VOLUME.

THE present era is remarkable for the commencement of what may be fairly called a new science, which has for its direct object the extension, so far as means may avail, of the average duration of human life. It would be culpable ingratitude not to hail with sanguine hope the energy of the sanitary movement, which now pervades Europe, and is nowhere, perhaps, so active as in England. It will not, perhaps, be until after two or three generations, that much impression will be made by its agency on existing evils. But posterity will, probably, see the public mind submitting to be enlightened, and the public will directed, by men who have rendered themselves com-

petent to the office. The result will, in all likelihood be, that, with God's blessing on the work, an incalculable amount of physical suffering will be averted, and a large accession of good, in all senses of the word, will be obtained. Each successive generation will occupy a position, as regards health, beyond that of its predecessor, and will leave to its children a still greater immunity from the bodily ills that afflict humanity.

The health of communities may be improved, without their having any intelligent apprehension of the reasonableness of the means employed; cities and towns may be drained and ventilated, and both rich and poor participate in the advantage, without one of the inhabitants understanding how the benefit was brought about. But the utmost good that can be effected by wise legislation, will be less than each individual may enjoy, if he will but co-operate with it. Acts of Parliament never will come into operation within the walls of people's houses, or regulate their personal habits. Personal good health must depend on so much that can neither be prescribed nor enforced by public authority, that no kind of information is more immediately important, than that which may induce each to provide for himself and his family the greatest amount of health which his circumstances render possible. While the necessary instruction was not accessible, the duty of being in good health could not be felt as it now may be and ought to be.

This country has surpassed all others in the number of medical philosophers who have endeavoured to diffuse, in a popular form, the knowledge on which the preservation of health depends. The ample and excellent works on this subject, which the last few years have produced, have, in general, founded all their recommendations on a broad basis of physiological instruction. Such a plan cannot be followed within the limits that must be observed in this short work. It may even be suspected, that it would diminish the usefulness of the volume. Few persons possess the power, and fewer still the will, to give sufficient attention to anything like a full exposition of such a subject. But still, the plainest and most precise directions for preserving health, if they are nothing more than a dry set of precepts and cautions, are not likely to do much good. If that were enough, all that is necessary might be printed on a card. It may, at first sight, seem an easier thing to adhere strictly to a code of laws than to enter into their reasons, and conform to their spirit, with an intelligent acquiescence in their wisdom. But we do not find it so in reality. The health of the body, like a more important kind of health—that of the soul—is constantly demanding that we should be able to say *No* to very powerful inclinations. Now, consistency and perseverance are more likely to be found in those who see that they are engaged in a reasonable service—who feel the force of motives, rather

than blindly obey the letter of a commandment.

Just so far, therefore, as may appear necessary to carry the understanding with what is recommended, the laws and facts of the animal economy will be explained, and this rather incidentally than formally. It will be scarcely necessary to declare, that no intention so preposterous is entertained as that of rendering medical advice unnecessary. The object is, to induce and assist the reader to keep and to strengthen his health, and even to recover it, when it has been lost by leading an unhealthy life. It needs only a moderate attention to keep on a track ; but if the traveller has wandered far away from it, he would not be a wise man who refused the services of a guide. In point of fact, it would be better to follow the advice of the medical profession, in our endeavours to enjoy the blessings of full health, than only to have recourse to it in illness. What is called a fit of illness, in nine cases out of ten, is only the crisis of long-continued ill health. The patient has not been well for a long time before he became ill ; and the illness is the result of many antecedent circumstances, which have been acting prejudicially on his constitution. It is hoped that this little volume may save many of its readers from the necessity of any such severe admonitions to reform the habits which are detrimental to health.

CHAPTER II.

GENERAL CONSIDERATIONS ON HEALTH—DIFFICULTY OF PERFECTLY SECURING IT—CAUSES OF THIS—BRIEF ENUMERATION OF THE FUNCTIONS ON THE DUE PERFORMANCE OF WHICH HEALTH DEPENDS—FINAL CAUSE OF ALL THESE—HEALTH OF MIND, AS DEPENDENT ON HEALTH OF BODY—HENCE THE DUTY OF ATTENDING TO HEALTH—GENERAL REFLECTIONS.

ABSOLUTE good health cannot be hoped for by any child of Adam. We suffer for the sins of our forefathers, and inherit the diseases and the tendencies to disease which they incurred. Causes of ill health have operated on the bodily constitution from birth. It is not in the power of more than a few, to select the circumstances under which they will live, and to avail themselves of all the suggestions which the enlightened physician is now prepared to offer. The mass of mankind will remain subject to poverty. Influences, adverse to health, rise unsuspected from the soil, or exist in the water drawn from the bowels of the earth. The arts and employments of life are often such as can only be rendered comparatively uninjurious. Toil of body and mind must often be persisted in, although known to be excessive. Sorrow, care, and

anxiety must be endured by thousands, who are ignorant of the only remedy against them—a living union to God; through Christ; and necessity will continue to oppose obstacles, often insurmountable, to what the instructed judgment knows to be expedient.

There are few readers who have not been exposed to one or other of these causes of ill health, and who will not, therefore, readily concur, for the most part, in the justice of these observations. Nor is there any reason why they should not be frankly made. They do not weaken the force of the advice, to strive to become as strong and well as possible. The whole of human life, very nearly, is a battle between good and evil; and in the matter of health, most of us have to make the best of what we would rather had been other than it is. Many will wish they had known in their youth what any one may know now, who once sees it to be his duty to try and be well. And many will wish that their parents had been taught that their children had bodies as well as minds, which also needed to be educated. But it is the rule of this life, however numerous the exceptions may seem, that whatever is made the object of intelligent pursuit, is, more or less, completely attained. And the manly, rational determination to be well, that we may be useful, will certainly have its reward.

Though our plan precludes any formal description of the various organs of the human body, and the functions to which they are sub-

servient, it is hoped that the reader will come to perceive that health, whether it be regarded as the sum of a thousand agreeable sensations, and the immunity from all such as are painful, or as the state which qualifies its possessor for all the duties and enjoyments of life, is the result of all the organs of the body doing what they were made to do; and that, in various ways, it lies within our power, either to secure or to destroy the conditions under which alone these purposes can be properly effected. The object of this volume is, to exhibit what these conditions are; and in doing so, there will be both opportunity and necessity to offer some explanation of the functions to which they are thus essential.

It will now be attempted to give a general idea of the functions upon which the health of the whole body immediately depends; some of them will afterwards receive additional notice. As we live by turning what we eat into our own substance, we have organs for receiving, masticating, and swallowing food, in our lips, teeth, tongue, and the other parts which convey the morsel into the stomach. Some of these, it is true, are used for other purposes, as that of articulate speech, economy of means in the production of various ends being frequently exemplified in our bodily structures. The swallowed food is subjected to various processes in the stomach and alimentary canal, in which the liver, for instance, participates. By the combined effect of all the organs of diges-

tion and assimilation, the nutritious part of the food is changed into blood, and conveyed into its current; while that portion which is incapable of such conversion is separated, and passes from the body. As it is out of blood that every structure of the body is maintained, there must be an apparatus to convey this "liquid flesh," as it has been aptly termed, throughout the whole fabric; and the heart, like a force pump, propels it through the arteries and their subdivisions, which carry it along to pervade and animate all our organs. The veins receive the blood again from them, when it has served its purpose, and bring it back to the heart.

But, as it returns to the heart deprived of what had fitted it to be the life of our bodies, and charged moreover with what renders it injurious to them, before it is again finally reissued from the heart, the blood undergoes another shorter circulation through the lungs, where it is exposed to the air, and the dark purple colour it has acquired in passing through the body, is changed to the bright scarlet, which characterizes it while it is being sent along the arteries, to penetrate and vivify all the bodily structures. What this change of colour accompanies and signifies, there will be fitter occasion to explain when speaking of the importance of pure air. It will then be seen, that we live on one of the constituents of the atmosphere, as well as on food.

The difference between the living and the

dead body may be thus stated:—While we are alive, decomposition is perpetually and proportionally accompanied by renewal; but, after death, decomposition proceeds uninterruptedly and alone. During life, the whole fabric retains its organization, and, therefore, its capacity of function, while the materials of its structure undergo constant mutation. The living state consists in this balanced antagonism, between the disintegration, which resolves the tissues into their component elements, and the forces of nutrition, which continually preserve their integrity. The blood, which carries to the tissues the means of renewal, bears away from them the products of decay. The exercise of function involves the conversion of the materials of structure into chemical combinations, which are no longer serviceable, but injurious to the economy, and these also are received into the returning current of the blood. Hence, there is as great a necessity that the blood should be freed from effete matter, as there is for the assimilation of food, to supply the conduits of life with fresh material. The liver, the kidneys, the skin, the lining of part of the alimentary canal, and the lungs, afford the means for this depuration.

All the organs and functions hitherto glanced at, (and the enumeration is designedly incomplete,) unite in the common object of supporting life. But it is life in the same sense as we apply the word to plants, which are almost wholly made up of the organs by which they

are nourished and developed out of what they feed on. And as our bodies are equally subject to the same necessity of preparing the elements of continued existence out of the substances used as food, all the organs by which this is accomplished are called organs of vegetative life. They occupy the central cavities of the body. The chest, containing the heart and lungs ; and the abdomen, the organs that are concerned in the digestion and assimilation of food, and likewise some which assist in removing matters which are no longer fit to be employed in the animal economy.

But all the wonderful mechanism of organs, by which the vitality of our bodily fabric is maintained, exists for the purpose of developing and preserving the whole of our bodies as instruments of our conscious, invisible, immaterial, responsible spirits, that is, our proper selves. By means of our bodies, we are placed in relation with the visible, material universe, and with other spirits, like ourselves. By our muscular system, we execute the purposes of our wills, procure the satisfaction of our desires and appetites, communicate our thoughts and feelings, and enjoy the converse and sympathy of our fellow men. For it is owing to the contraction of muscles that the face assumes all those aspects and expressions, which signify the feelings of the mind ; that the air, as it is driven out of the lungs, is made to render forth the infinity of tones which characterize the human voice ;

and that the voice is formed into articulate utterance. Muscles adjust and direct the wonderful optical mechanism of the eye, and they form part of the apparatus of hearing. With the exception of the muscular tissue, which is immediately concerned in carrying on the vegetative life, all the muscles obey the mandates of the will, and are the instruments of action to our minds; and, as the reader must be aware, they constitute the great part of the bulk of our bodies.

However interesting it might be, it is not necessary to describe at length how it is, by the means of nerves of sensation, that all kinds of impressions upon or within us are communicated to the brain—or how, by nerves of voluntary motion, all the volitions which have for their object the movement of any part of our bodies, cause at once the contraction of the muscles within whose substance their course terminates. Still less can we dwell upon many other exceedingly interesting facts, illustrative of the nervous system. But we are most intimately concerned to draw attention to this fact, namely, that the brain is the especial organ of the intelligent and sentient mind. As we ascend from the lower to the higher orders in the scale of animal existence, and arrive at the proof of a power of choice and voluntary motion, a peculiar substance begins to appear in distinct masses, in a situation in respect to the other organs, analogous to that occupied by our brain. In proportion as animals are seen to

be endowed with instinctive propensities, feelings, and intelligence, these masses increase in number and size, and their aggregation begins to resemble the arrangement and position of the human brain. But, in man, as he surpasses all inferior beings in intellectual and moral capacity, we find so much more nervous matter added, to the building up of the large mass which fills his skull, and confers on the human cranium that amplitude and configuration by which it is distinguished. It is agreeable to all analogy to conclude, that the manifestation of every additional endowment, whether of sensation, instinct, or thought, has been made dependent on a special and distinct addition of nervous matter. So that the brain of man may be conceived to differ from that of all inferior creatures, by just so many distinct masses of nervous matter, as he possesses intellectual and moral capacities peculiar to his exalted nature.

Now, if our Maker has instituted a connexion between inert matter and the manifestation of consciousness, we cannot safely allow ourselves to deny it. It is true, we cannot help conceiving of mind and matter as essentially distinct. No subtile modification of material existence or agency will ever explain thought. No man, probably, ever seriously thought he could explain thought by calling it a vibration of fibres, or a secretion. The phenomena of consciousness remain standing out in undefinable, but broadest contrast and con-

trariety, to anything which comes under the appellation of matter, or any of its modes of existence. Yet, it is a fact that cannot be gainsaid, and from the practical acknowledgment of which nothing but good can flow, that the thinking, feeling, responsible man, who is made capable of serving and enjoying communion with his Maker, depends in the present state of existence, and both as regards the highest as well as the lowest exercises of his immaterial nature, on the healthy condition of his brain; and that he has the health of his brain, and so far of his mind, placed to a very great extent in his own power. Can he not make himself mad by strong drinks, or reduce himself to the state of an idiot by criminal excesses? If, again, what should be separated from the blood and got rid of, by either the liver or the kidneys, is retained, the whole colour and complexion of man's thought and feeling suffer a change, and he becomes deprived of energy and a prey to melancholy. But we have no space to multiply proofs. Health includes health of the brain, and to leave it out of our calculations, is to entail heavier penalties than follows from any other kind of neglect of the body.

The statement of this truth may possibly raise some alarm, lest it involve that other great truth of man's immortality in doubt. However, it really has nothing to do with it. Thought does not itself necessarily imply immortality, for there are plenty of animals that

think after their fashion, and yet are amongst the beasts that perish. It is not declared of them that they shall live again ; it is so declared of man. Even if mind were only a form of matter, this curious form of matter that thought, felt, and remembered in this life, might, if it were the will of its Creator, exist again and for ever, to enjoy or suffer according to its conduct in the present state of existence. What is called materialism may be very bad philosophy, but if it were not, it would leave the truths of revelation just where it found them. Man is not immortal because his mind is immaterial, for his body also is to be immortal ; but because his Creator and Judge has designed and pronounced that he shall live again, and for ever. In this life, nevertheless, there is no evidence that consciousness is ever independent of the brain. Some mysterious link of connexion has been established between them ; and the manifestations of consciousness are interfered with, or stopped altogether, when, by any means, the material organ is rendered incapable of performing its function. When it is so, the mind ceases to have to do with the present system of things, even sooner than the body.

Nearly all the rest of our bodies, then, may be said to exist for the sake of our brain and muscles, or for the sake of our minds and their servants. The natural and efficient discharge of the various functions which are grouped together under the term vegetative, constitutes good health, and involves the power of using

our minds and muscles, and the proper use of these is one of the most important means, both of keeping and getting good health. At the risk of reiteration, some trouble will be taken to make this evident to the reader, and the next chapter will consider the subject in relation to the employment of the muscular system.

CHAPTER III.

ON EXERCISE.

ALLEGORICAL ILLUSTRATION OF THIS PRIME CONDITION OF HEALTH—REASONS OF ITS IMPORTANCE—NEGLECT OF IT A VERY GENERAL CAUSE OF ILL-HEALTH—ITS EFFECT IN EQUALIZING THE CIRCULATION — THE BENEFITS WHICH RESULT FROM SUCH EQUALIZATION, AND THE INJURIES TO HEALTH WHICH FLOW FROM THE CONTRARY CONDITION—FACTS AND ILLUSTRATIONS—EXTENT TO WHICH EXERCISE SHOULD BE CARRIED—VALUE WHICH THE ANCIENTS ATTACHED TO IT.

SUPPOSE that part of a locomotive engine consisted of a chemical apparatus, by means of which the fuel which generated the steam was not only the source of power, but actually became converted into the various parts which entered into the construction of the engine—even keeping the chemical apparatus itself in repair. Suppose that the same power which made the driving-wheels revolve, also set in operation the contrivances which effected this wonderful transmutation of fuel into brass and iron—what would be the folly of the engineer, who expected them to go on though the engine were kept idle? Suppose, again, that while the locomotive was doing its work, provision were made for freeing it from every atom of its sub-

stance which had become detrimental to its perfection and efficiency, and from the useless and incombustible part of its fuel; while, on the other hand, rust and ashes, and all the products of wear and tear, would clog its valves, wheels, and pistons, and continually tend to spoil its elaborate mechanism, when it was allowed to remain unemployed.

Now, something analogous to all this is true of our bodies. They continually perish in the using, and while we are in health, they are as continually renewed. Perpetual disintegration and repair accompany the actions of all our organs. Every portion of the human fabric is always decaying and always growing again. The solid structures are unceasingly separating from the fluid blood the material which composes them, and again rendering it up to the blood, when it has performed its part in carrying on their functions. Health is made dependent on this constant interchange of matter, which thus maintains all the constituent parts of our bodies in their peculiar form and structure. And it is whilst they are effecting the several purposes which they are intended to serve, that this constant renewal is secured for all the organs of our bodies, and they are preserved in a condition to perform their proper functions. The result is—Health. This due, unimpeded activity of all the bodily functions, there is reason to think, is accompanied by numberless positively agreeable sensations; and it is the consciousness of these, or rather of the

sum of them, that is expressed by, and justifies the common phrase of "enjoying good health."

It seems first of all desirable, to dwell on that which may be called the indispensable internal condition of health, which, as we have attempted to show, consists in securing the activity of all the vital processes, by which the integrity of the whole body is maintained. We shall afterwards see, that many of these depend on external conditions, which we must do our best to procure—such as the supply of pure air, the regulation of temperature, exposure to light, food adjusted to the necessities of the system, both in respect to quantity and quality, and other particulars to be subsequently noticed.

But there are many people who have the full advantage of all these, and yet do not enjoy good health. Either from indolence or inadvertence, they neglect muscular exercise, and thus deprive themselves of the means of calling all the vital functions into activity. It is not possible to superintend, directly, any of the great functions which carry on the repair and purification of the body. They are all beyond the control of the will. But, by taking care to employ the muscles which are the organs of voluntary motion, and constitute the great bulk of our frames, we can, in various ways, put into effective operation all the processes which preserve the health of the whole fabric.

The truth is, that it is hardly possible to say anything too strong in urging the import-

ance of real muscular exercise. No one deserves to be well, and certainly no one can keep well, without it. Nothing so perfectly secures the conditions on which health depends; and if our daily duties do not oblige a sufficient use of the muscular system, we must make a duty of it.

A brief account of what muscular exercise involves will render it plain, that the various component structures of our bodies, like those of the imaginary locomotive engine, are preserved in their state of greatest efficiency by *use*; and that we have no other sure method of using the organic functions on which the vitality of the body depends, but by using our muscles. A life of muscular inactivity leads to imperfectly assimilated food, and, therefore, to ill-elaborated blood; and out of such blood, to bad materials for keeping all our organs in repair. Moreover, it is quite as essential to the health of our bodies, that they should be relieved of the products of functional activity, as that they should be supplied with substance to renew them; and it is during and after exercise that those purifying operations are most active, which remove old materials from the blood, and prevent the waste and refuse of our tissues from remaining within us to generate disease.

In the first place, exercise equalizes the circulation. Everything that is accomplished by organization requires the presence of blood. The reciprocal action between the blood and the organs furnishes, in all instances, the condi-

tion on which function depends ; and the quantity of blood that has access to an organ, must be just what is needed by the particular function that the part is destined to perform. Some need to be very copiously supplied, even to turgidity, during the periods of especial activity. But, as a general truth, it may be said, that there is, in respect to each particular organ, a state of its circulation midway between excess and deficiency, which fits it for its purpose in the economy. Now, it has been estimated that one-fifth of the whole weight of the human body is due to the blood it contains ; so that a full-grown person has within his body between twenty-five and thirty pounds of blood. If a due proportion of the entire mass of blood is not distributed throughout the muscles and the skin which covers them, as it must be somewhere, it will remain in the central organs before spoken of, to overload and embarrass them.

The contraction of our muscles in what fairly amounts to exertion, in whatever shape we may choose to make it, attracts the blood into the muscles. Every act of contraction requires the presence of arterial blood, that is, of blood which has dissolved in it the oxygen of the air—this function of muscular fibre being dependent on the combination of oxygen with some of the elements of muscular tissue ; so that, to set the muscles contracting vigorously, is to invite the blood into them, for they will not contract unless they are supplied with

plenty of blood. And as the blood, after it has taken to the muscular tissue its supply of oxygen, becomes loaded with the result of the combination between the muscular substance and the oxygen, there is a double necessity for the blood to be sent on through the lungs, in order to have its oxygen restored to it, and to get rid of the carbonic acid with which the waste of muscular substance, by use, has loaded the returning blood. So that it is easy to see why exercise quickens the circulation and the breathing. The heart, unoppressed by having to drive an excess of blood through the lungs and other central organs, responds at once to the demands of the muscular system ; and the very contraction of the muscles themselves, by pressing on the veins, in which the blood can only flow one way—namely, towards the heart—because of their valves, helps the heart to maintain the onward course of the blood, from which the following results take place :—The central organs of the body, contained within the trunk, are relieved of superabundant blood, and the various processes which they are intended to effect, are carried on with ease and perfection. A thousand aches, and stitches, and feelings of local discomfort, which attend a state of congestion, disappear. The oppressed breathing, and sense of anxiety and lowness of spirits, which signify that the heart and lungs are overcharged with the circulating fluid, yield at once to this obvious and only true mode of relief. Sal-volatile would no longer be thought

of by languid and lazy people, determined to see what it is that inflicts upon them all the small horrors of an unoccupied and lounging existence. Let them equalize their circulation by a brisk walk, and low spirits, inaptitude for thought or exertion, pains in the chest, sides, or back, will vanish. Drops of lavender, and tea-spoons full of Eau de Cologne, will certainly give the heart a slight stimulus, and enable it, for a short time, to push along the blood a little better. But this is not nature's way, and they are only making bad worse by relying on it. Their condition is simply one of ill-distributed blood, and there is no mode of getting this remedied but that of downright exertion of their muscles, by which the helpless organs, on which the reparation of the body depend, may be relieved from bearing the presence of more blood than they need.

Half the complaints peculiar to women are produced by ignorance of this reason for exercise; and they have, in fact, just so many additional motives for resisting that disposition to inactive life, which is, unhappily, their peculiar temptation, because their sphere of duties is contracted, and does not afford the same necessity for exertion to which most men are subjected. Thrice happy is she, who, if she have no relative duties which compel her to be active for others, and to forget herself, makes duties for herself out of offices of kindness and visits of mercy. She will have less occasion to think of preserving her health, for that will be

one of the rewards superadded to a cheerful mind and a serene conscience. But there are many, whose duties are confining and sedentary, and who are rather to be pitied than blamed for the effects of an unequal circulation. The incessant toil of the sempstress cannot easily be healthfully diversified by general muscular exercise. Yet there are many people who seek relaxation by amusing change of occupation, and with comparatively little effect, who would attain their object more completely by snatching one half-hour's sharp walk, when it cannot be longer.

We have already seen, that strenuous muscular exercise involves the purification of the blood, as far as that takes place in the function of respiration; and it contributes to this result when it is taken in the open pure air. It has been found, that the rate of mortality amongst people whose employments are both sedentary and confining, who pursue their accustomed labour in ill-ventilated rooms, like the Spitalfields' weavers, is absolutely less when they are out of work, and, therefore, insufficiently fed, than when they are fully employed, and in receipt of good wages; though, as a general fact, the rate of mortality is greater in the populations whose means of subsistence, in the shape of food, are diminished; there is no way of explaining this apparent discrepancy but this. When the weaver is out of work, he is out of his workroom, tending his pigeons, and wandering in the suburban country. The

greater supply of pure air stands him in the place of food. He gets oxygen, and gets rid of his used-up material. His body is both better nourished by what he does eat, and better purified from the products of that continual disintegration, which we have seen is the constant accompaniment and condition of all our vital and animal functions.

For not only does exercise give the lungs fair play, but, inasmuch as it relieves all the other internal organs of superabundant blood, and keeps this in equable motion within them, exercise also places them in the most favourable condition to effect their several purposes. For instance, the liver is one of the most important organs of depuration, that is, part of its office is to pour out into the intestinal tube, under the name of bile, a fluid, which, in addition to the function it performs in digesting food, is nature's aperient medicine, and also contains a great quantity of a substance that the system needs to be freed from. It is not intended to puzzle the reader by a long account of the much-controverted chemistry of the liver. Suffice it to say, that it shares with the lungs in the office of removing from the blood the carbon which, after entering into the fabric of the body, has, in and by the functional activity of its organs, and especially of its muscles, been returned to the blood. It passes out from the lungs united with oxygen, as carbonic acid gas, and from the liver, in another state of combination, and in a fluid form. Now, nothing contributes to

set the liver at work so much as exercise. First, because exercise relieves the organ of superabundant blood ; and next, because the more exercise we give to our muscles, the greater are the products which require to be removed from the blood by its agency. So that exercise is the best way to take medicine, for then nature will undertake to effect for us the object we seek to attain by digestive pills, family pills, and the whole host of both quack and regular contrivances for regulating the bowels, which may often be necessary enough, but the necessity for which is the sign of a departure from health, and it is a laudable ambition to seek to be relieved from it. A *healthy habit* of body in this respect will, in nine cases out of ten, be the reward of resolute perseverance in the *habits of health*, of which exercise is the chief.

Just as exercise promotes the flow of the secretion of the liver, it does the same thing for that of the lining of the intestinal canal, and the innutritious part of the food, thus diluted and mingled with the bile, which stimulates the muscular tissue of the bowels to propel their contents onwards, is removed from the system, along with many matters whose presence has become detrimental to our bodily organization. This secretion from the lining of the intestinal canal, is one of the most important agents of relief to our bodies. There is abundant reason to think that chemical compounds, most noxious to health, are continually being sepa-

rated from the blood, through the secreting power of the mucous membrane of the bowels. It is certain that health is often restored, by means which are intended to increase the activity of this secreting process. And one effect of habitual confinement of the bowels may be understood to be, the retention of deleterious matter within the system. The sense of lightness and relief, even the sudden recovery of health which frequently attends the action of judiciously prescribed aperients, points to this fact. At any rate, no medical man doubts it.

The brain may be regarded as one of the organs which are peculiarly liable to be inconvenienced by want of equilibrium in the general circulation; for it must often happen, that during the idleness of the limbs, the mind has been energetically employed, and if so, the access of blood to the brain, has been necessarily encouraged. The full and tranquil current of blood, which is required by the organ, in its state of activity, *may* pass into a condition of local excitement of the circulation, which is denoted by the headache, flushed face, and throbbing temples, that often succeed to study unduly prolonged. The mind itself may pass out of our control, and persist in the trains of thought which have occupied it, after we have felt repose to be desirable. Such a state should be carefully guarded against, as fraught with present danger, and inevitably leading to eventual debility of the brain. But, although no such well-marked signs of an overworked

and overcharged brain should present themselves, there are many degrees of such a condition, which we should do well to attend to. A sense of weariness, some inaptness in prosecuting our subject, and sensations within the head that perhaps do not amount to pain, are often most effectually relieved by a resolute and rapid walk, which restores the blood to the chilly hands and feet, and spreads a glow over the whole surface. The Jesuits, who at least understand the art of tuition, are said to interrupt the studies of their pupils for the sake of muscular exercise at intervals of two hours; and a similar plan is sometimes pursued in the education of children. In both cases, the effect is, to enable the brain to bear more work than it otherwise would without injury.

It is not possible, in this little volume, to say all that might be said of the importance of exercise, as maintaining equality of circulation. If exercise is customary and habitual, it will maintain the circulation in healthful equilibrium, and not only relieve it when it is in the opposite state. For instance, the muscles have their substance used up, whilst they are being employed in vigorous contraction. But, in the intervals of rest, they will grow, enlarging by an excess of gain over loss. And if they grow, it must be because blood is circulating through them, out of which they may appropriate the material of muscular tissue. So that it will not be only whilst we are taking exercise that we shall be equalizing the circulation, and

deriving the benefits which attend that condition—we shall live through the day and sleep through the night, under this prime condition of comfort and health ; while we rest we shall be growing more fit for greater exertions. The exercise which fatigued at first will not be enough to satisfy us, as we get stronger and larger muscles. The contour of our bodies will improve. Firm, hard muscles will overlay and hide our bones ; and as we have been favouring *all* that the nutrition of the whole body depends on, we shall wear the general aspect of health.

The feelings of health dispose their possessor to habits of activity, and habits of activity produce the feelings of health. Half the small maladies that tease the body, and the mind also, would disappear under a sustained course of muscular exertion. And it is only from persistence in good habits, that any great and permanent benefit is to be derived from them. Constitutions that seemed to be ruined, have been restored under this regimen of daily exercise in the open air. A daily walk of ten miles has recovered a well-known author, by his own confession, from the dreadful state to which he had been reduced by eating opium, and furnished a most signal exemplification of the advantage of seeking health, by prosecuting the habits of health.

It is almost a hopeless task to endeavour to persuade the female sex, generally, to renounce the use or even the abuse of stays. It has been

shown over and over again, that they disfigure the outline of the person, and therefore positively frustrate the chief purpose for which they are worn, and a catalogue of the maladies that are directly traceable to their employment has often been given. If exercise be the only effectual way of preserving health, how can it be thoroughly prosecuted by people who have prevented the expansion of their lungs by tight lacing? If the equal circulation of the blood be the great condition on which health depends, how can that be enjoyed, when a constant pressure is kept up on the organs most necessary to life? The ordinary plea is, that "we could not do without stays—they are such a support." This amounts to proof that they have already done a great deal of harm, and had better be summarily dispensed with. Woman, equally with man, is furnished with muscles to hold the body upright. If she rely on the "busk" of her stays instead, the muscles will certainly become weakened, and unable to do what they were intended for. The remedy is, to throw away the stays, and the muscles, when put to their work, will very soon become strong again. Moreover, the pressure of the busk on the pit of the stomach is a very common cause of indigestion.

Another mode of defending the use of stays is, to declare that they are "not laced tight." If so, there can be no objection to giving them up altogether. But, though it is possible that, by drawing in the chest, that is, by emptying

the lungs, the hand *could* be put down between the stays and the back, yet they *must* be continually restricting the play of the ribs. Few women, perhaps, ever fairly tried the experiment of "going without stays" for three months, who wished to return to the use of such uncomfortable and unsightly contrivances.

The importance to be attached to exercise, and its inseparable connexion with good health, was better understood by the ancient Greeks and Romans, especially by the former, than by ourselves. They saw more clearly that the perfection of the whole man was to be effectually obtained only by a due development of his physical as well as his intellectual nature, and that the healthy condition of the mind depended on a perfectly healthy condition of body. Hence, they made the two parts of education an almost equally serious business, and did not leave exercise to be a matter of accident; hence the importance they attached to the gymnasium and its athletic exercises. The "sound mind in a sound body," (not either alone,) was the almost proverbial expression of well-being; and surely the eminent intellectual capacity and achievements exhibited by this remarkable nation, will serve to show, that the mind is no loser by due attention to the body.

To what point ought exercise to be taken, when the only object is to keep in health? To perspiration, even in cold weather. It will be more convenient to postpone the consideration of the various functions discharged by the skin,

till we come to speak of the kind of attention that most important organ of our bodies demands. But we must here say, that to induce and keep up perspiration by exercise is to furnish ourselves with a test that exercise has really answered its purpose.

Little need be said here of the various modes in which exercise may be taken to produce this effect. Everyone can select his own way. That will be the best way which the mind regards as a positive recreation, for reasons that will appear in a subsequent chapter. But, if the benefit can only be derived during the course of our daily duties, it ought to render them pleasant. The walk to and from the place of business, may just as well be taken with the cheerful remembrance that it contributes to keep the body in health, as looked upon in the light of a disagreeable necessity.

Passive exercise, as it is called—such as a ride in a carriage—we have nothing to do with. It may be prescribed when the individual is under medical care; but it is not the way to secure the benefits we have been considering, and therefore it need not engage our attention.

CHAPTER IV.

ON NUTRITION AND DIET.

SECTION I.

ON THE TRUE NOTION TO BE ATTACHED TO NUTRITION.

NUTRITION does not consist merely in eating so much food, and suffering no inconvenience during the hours of digestion. The act of nutrition is not completed till the food has become part of our bodies. It may become part of our blood, and yet only serve to make us more liable to disease, if the "liquid flesh" of the blood is not used in repairing the solid flesh of our corporeal structures. The blood itself may be rich and good, but if all this nutritious matter be not employed, which it cannot be by the idle and the listless, or by any who leave their muscular system without sufficient exercise, the overcharged vessels will be likely to relieve themselves somewhere or other; and the point where this happens will determine whether the event is remedial in its tendency, as in bleeding from the nose; highly dangerous, as when blood exudes from the capillaries of

the lungs ; or absolutely fatal, as when the same thing takes place in certain portions of the brain.

From what has been said, it is plain, that people ought not to be satisfied that the processes of nutrition are properly carried on, unless they find the result in capacity for exertion, good spirits, and those delightful sensations which accompany the healthy, unembarrassed performance of the vital and animal functions. The inquiries of modern science have made it almost certain, that derangement or imperfection of function is owing to imperfection of structure. If this be true, it may be easily conceived, how perfection of nutrition would involve perfection of structure, and therefore of function—brains capable of sustaining prolonged thought ; hard muscles, able to exert themselves vigorously without undue fatigue ; large distensible lungs, fit to carry on the respiration needed by a healthy activity ; a heart, arteries, and veins, strong enough in their tissues to maintain the full and equable circulation of the blood ; a skin, elastic and fresh-coloured, always purifying us by its insensible perspiration, and the seat of a thousand pleasurable impressions ; and organs of digestion, which give us no consciousness of our having eaten, except by the exhilaration of restored energy—in other words, perfectly good health.

It would be somewhat utopian for all men to resolve to answer to this description. Such an amount of organic good health is not possible,

it may be safely said, to a multitude of the most useful members of society. The student, the lawyer, and all persons whose duties are sedentary and confining, must put up with less. But then they do not want so much. The professional man, or the artificer of some craft which calls for skill rather than strength, has no reason to lament that his muscular energies would not suffice to take him up Mont Blanc, or to walk a thousand miles in a thousand hours. Every one ought to be satisfied with that attainable degree of good health, which makes him equal to his duties, and renders his exertions, upon the whole, a source of enjoyment, and not injurious to health.

What is called "training," is a well-known plan of inducing the perfection of physical health. The method is, "to begin on a clear foundation" by an emetic, and two or three strong doses of medicine. Profuse sweating is also relied on, to free both the solids and the fluids from every particle which has already served its purpose of maintaining life, and is now only an incumbrance to the organization, all superfluity of fat disappearing under the process. The dieting then commences, and is well nigh restricted to beef and mutton—veal, pork, and lamb not being found to turn so readily into muscle, or to be so digestible. Fish is forbidden for the former reason. Stale bread is the only vegetable food allowed. The quantity of fluid permitted is three and a half pints per diem ; but fermented liquor is strictly

prohibited, unless in cases where the vigour of the constitution has been impaired. The daily quantity of exercise is very great, and of course accompanied by much perspiration. "The effects of this regimen are, hardness and firmness of the muscles, clearness of the skin, capability of bearing continued severe exercise, and a feeling of lightness and freedom in the limbs. During the continuance of this system, it is found that the body recovers with wonderful facility from the effects of injuries, wounds heal very rapidly ; cutaneous eruptions disappear. Clearness and vigour of mind, also, are stated to be the results of this plan."*

The object of training is, generally, to qualify for some useless feat of strength and endurance; but what some men are content to do for a short time, and for one specific purpose, all might make, in a sufficient degree, the habit of their lives, and with the certainty of prolonging their term of enjoyment and usefulness. It has been seen that the brain partakes of the advantage equally with the muscles. There would be no occasion to eat so much meat, or to use such severe exercise, when the development of the muscular system is not the immediate purpose. There are many people whose condition is seldom better than that of invalidism, who might adopt, under advice, a plan essentially the same, with every probability of absolutely getting new bodies, and that of the best substance. Indeed, every rational plan of

* Carpenter's Physiology. Third Edition, p. 496.

confirming or restoring vigour of constitution must proceed on the same principles, and the chief reason of the success of training is, that it applies them thoroughly. The benefit of the plan is owing to the perfection of nutrition, which is secured by these three requisites—a diet easily changed into bodily substance, a proportionate use of what is made, and, as a consequence of that, the removal of all the material of organization when it is done with. And, without anticipating what will be mentioned in future chapters, it must be remembered, that the system of training involves much exposure to the atmosphere, and a wholesome exhilaration of mind. It is popularly believed, that such a regimen can only be employed with safety as a temporary expedient, because trained men are apt to fall into bad health afterwards. This is partly due to their recurrence to intemperate habits, and partly because, after generating a great capacity of being nourished by food, they leave off the exertions which rendered such an amount necessary. The remedy would be, either to continue the system, or to proportion the supply of aliment to the diminished activity.

SECTION II.

ON APPETITE, AND ITS DUE REGULATION.

NATURAL hunger must be regarded as the result of expenditure, and indicative of the

need of supply. The lawyer in his chambers, the clerk in his office, and everybody who is employed in one kind or other of mental activity, have been wearing away the substance of their brains. The labourer, the pedestrian, and all who have been exerting muscular force, have been expending what muscle is made of, and, in truth, what the whole body is made of. If the individual has not already fallen out of that wide range of bodily condition which deserves the name of health, appetite will intimate the necessity of renewing the supply of those substances which have been disappearing from the blood, as the organs were discharging their respective functions. For the sense of hunger is not so much a sign that the organs have been rendered unfit for further use, by their previous exercise, as a timely warning to provide against this contingency, by restoring to the blood what the organic structures have taken from it. This admonition is at first pleasurable. We are conscious of it, rather by desires it suggests, than by sensations which we wish to remove. The taste of viands is remembered, and the "mouth waters" on the presence of these recalled sensations—secretion following sensation, and sensation, up to a certain degree, occurring from the mere remembrance of what ordinarily occasions it.

If food is now taken into the stomach, and in moderation, the mind is freed from the distraction of appetite, and pursues its trains of

thought with ease and aptitude ; and the muscles will go on contracting, while we continue the efforts which produce their contraction ; and this long before there can be any conversion of food into blood, or of the blood into structure. But, if the warnings of appetite are not attended to, (and often the mind is too much occupied to notice, or even to feel them,) hunger is succeeded by exhaustion, by positive distress, by sickness at the stomach, and by feebleness of all the powers of mind and muscle, as well as of the organs of digestion themselves. Thought cannot be maintained ; the limbs are pervaded by a painful sense of fatigue ; the circulation runs down ; and the stomach either refuses to receive food, or is oppressed and nauseated by its presence. The practical rule to be gathered from all this is, to eat in time, and with moderation. The custom of getting through a severe morning's work, perhaps with only a crust or biscuit to stave off the feeling of hunger, and then sitting down to a late dinner in a state of exhaustion, which seems to justify a great deal of stimulus, is in every way prejudicial. Digestion, if duly performed at all, will certainly be unduly prolonged. Moreover, every one must sometimes have felt a disposition to eat an unusually full meal after long abstinence, and experienced the sense of oppression and drowsiness which are apt to follow. As this is a slight degree of a condition, which, carried to a certain point, may issue in apoplexy, it is well to prevent it, by

purposely making a moderate meal in such circumstances.

If the duties which occupy us are engrossing, and draw off attention from our bodily sensations, it will be necessary to establish the habit of taking food at certain times, which experience has pointed out to be in accordance with the demands of the system.

There is reason to think, that the stomach requires to be left empty and idle between the acts of digestion. *Four* hours may be allowed, in general, for the process of digesting a moderate and wholesome meal, and *one* hour for the repose of the organ ; so that, if a breakfast, proportioned to the life of exertion or inactivity we may be leading be taken at *eight*, by *one* o'clock there will not only be a necessity for replacing expenditure, but the stomach will be ready to receive with appetite what we put into it ; and it would, perhaps, be better if this next meal were a dinner. But if, on account of social duties and arrangements, dinner must take place later in the day, the luncheon should not be dinner disguised under another name. In kind and quantity, it ought to be such as will leave us perfectly able to go on till dinner—a meal so light and spare that we require no repose afterwards.

As we have no means of estimating how much of the substance of our bodies we have expended, we are left to the guidance of sensation and experience, to tell us both when to eat, and when to leave off. There is a plea-

surable point in meal-times, when all uneasy sensations of exhaustion and craving have been removed, and a comfortable refreshed feeling has taken their place. The spirits are no longer languid or possibly irritable, but a general sense of contentment and alacrity returns to mind as well as body. This is nature's voice crying to us to stop, and we must be on the watch for it, until temperance has become a habit. It is, perhaps, easier to hear this admonition, when the table is simply furnished. But moderation depends on our own powers of self-control, and is just as often exercised by people who are accustomed to a diet of varied luxury, as by those who dine on a plain joint. It is not necessary that the dishes should be such as an epicure would choose, for people to eat too much. The fault and vice of intemperate indulgence in eating is, perhaps, more common than that of intemperate drinking, and does quite as much harm both to body and mind. People over-eat themselves to relieve the tedium of a life without the interest of duties diligently discharged, and affections properly exercised. Meal-times, they find, are at least periods of vivid and pleasant sensation, followed, if they are strong digesters, by a state of torpid tranquillity. Such persons are mostly inactive, both in mind and body; and the perils of too much blood are averted by purgatives, which drive the aliment along too quickly for its absorption, or pour it out from the blood again into the bowels, before it has

been incorporated with their solids. Leamington or Cheltenham, when people are rich, or popular pills, when they are not, may help them to ward off for a time the inevitable effects of this animal sort of life. But, long before their bodies begin to suffer, their minds and spiritual parts are overlaid and oppressed. Slowness of intellect, lethargy of feeling, and insensibility to moral considerations, and all the evils that result therefrom, together with a person and aspect in conformity with such a character, creep surely upon them ; and, probably, paralysis or apoplexy at last terminates a course, which has always been approximating towards such a state. Some may say, that at least the moral and mental effects are just what we should expect from people not attending to anything better, and that the mind suffers through the mind, and not through the body. Both views are doubtless correct. Yet the heaviness of after dinner is more or less the habitual state of excessive eaters. Oppression of the brain is what they always labour under to some extent, and this, however induced, manifests itself in the enfeeblement of the intellectual and moral capacities. Nor is this opinion at all invalidated by the fact, that many great thinkers have been great eaters. If people are great thinkers, it is a good thing for them to have good appetites and a healthy digestion, for thought is one of the great occasions of expenditure.

But it is neither a mistake nor a sin to relish

our food ; both food and taste are gifts of God ; in fact, there is a close sympathy between the palate and the stomach ; the latter will not digest that for which the former feels disgust ; and to entertain the sense of taste, is very often the way to excite the power of digesting. The imagination of children often prompts them to dislike their food, or part of it, from its fancied resemblance to things that are not proper to be eaten. In nine cases out of ten, this daintiness will yield to the example of those who eat with them. If they can be induced to eat what they would rather not, the palate will mostly set the fancy right. But if the morsel really remains unswallowed in the mouth, it is not unlikely that the difficulty points to an instinctive repugnance, which had better be complied with. For instance, children make sufficient fat out of their food, and do not need to have it supplied to them ready made, as part of their ordinary diet. To make them eat it will only confirm a disgust, that would otherwise disappear in due time.

As the primary condition of digestion is, that a certain secretion should be poured from the lining of the stomach, to be mixed with and act on the food, whatever interferes with this will render digestion difficult or impossible. Previous loss of the fluid part of the blood, by perspiration from exercise in hot weather, for instance, will stop the secretion of gastric juice, just as it renders the mouth dry ; and nature will, in such circumstances, ask for liquids by

thirst, before she asks for solids by hunger. Mr. Abernethy used to speak strongly against drinking before, or even during eating, because it diluted the gastric juice. But there does not appear any just reason for this precept. This fluid seems to be secreted, or given out only when food is present in the stomach, and appetite seems to depend on the certainty that the food, when it is swallowed, will meet with the secretion. Now, the blood may be too thick to serve the purposes of the secreting organs, and may need dilution; and as the liquids we swallow disappear in a few minutes from the stomach—the thinner fluid penetrating through the coats of its vessels to mingle at once with the denser blood—there would seem more reason for a contrary precept, in those cases in which people find that they have no appetite till they have allayed thirst. A sense of exhaustion will justify the slight stimulus of a glass of wine or beer before eating; for if the circulation has run down, this is another impediment to secretion; but then it would have been better to eat sooner, and before this degree of fatigue. Nothing, however, can be worse than to drink stimulants during a meal for the sake of prolonging appetite, when appetite has not been earned by exertion. There is no surer way of establishing a long series of morbid actions, commencing in the stomach with indigestion, and ending in some of the many consequences of having the body made from blood of bad quality, because

that has been made out of ill-assimilated food.

The weary man should rest before he eats. When, from any extraordinary cause, fatigue has been excessive, five minutes of sleep before dinner is taken will often restore appetite, and confer the blessing of easy digestion. Every one knows that bad news suddenly told will take away appetite ; anxiety will give the feeling of nausea ; and a state of grief, while it lasts, almost deprives us of the power of eating. These are examples of the effect of emotion of mind on secretion, and show that the function of secretion, though not needing nervous influence, as it is called, (for it goes on where there can be none, as in plants,) is yet under nervous influence.

If possible, then, continue to eat in a thankful and cheerful frame of mind, and you will have appetite enough, and no occasion to think of digestion. Use the power which all possess, of giving attention to one thing at a time, and to the proper thing at the proper time. There is a time for all things. Let dinner-time be tranquil and disembarrassed. If you must eat alone, make some light and interesting publication your companion. Better still is it, if you can dignify your meal-times by making them serve as occasions for cheerful and kindly social intercourse. Man should not feed as the beasts which perish, only intent on being filled. It may be safely said, that an abundant, but not excessive meal, taken under such enlivening

influences, does more good, and sits more easily, than the slighter repast of the lonely, hurried, and anxious man; for his digestion will be imperfectly performed, and though the operations of the stomach do not constitute all that process which food must be subjected to, yet they are the first; and if the food passes through the stomach without properly undergoing the changes which ought to be effected there, those which are to follow will not be duly effected.

It should ever be remembered, that the object in eating is not to see how much can be taken without suffering or injury, but rather how little. The repair of the body and the energies of the mind, will be best secured by just so much of wholesome food as is really required, and no more. There can, however, be no virtue or wisdom in any degree of abstinence which deprives us of the blessings of strength, ease, and energy; but there is wisdom in finding out, as nearly as we can, how much aliment will procure these for us, and to limit ourselves to that quantity.

It is now not unfrequent for individuals actuated by some prevalent religious opinions, to feel a satisfaction in frequently undergoing the pains of too slight a diet; partly, as it would seem, from the error of supposing that self-inflicted suffering is pleasing to their Maker, and partly because it favours the maintenance of states of emotion, which are thought to be desirable. Even if the moral results were

really worth having, this "neglecting of the body" induces such a disabling train of symptoms, as ought to convince them of the mistake they are making. In the first place, their attention is, after all, more strongly engaged about their bodies than it otherwise would be. The exertions which duty requires of them are made with difficulty. Irritability is never far away from a sense of depression and sadness; and the person who has supposed that he has fasted himself into meekness, will often find that he bears a sudden cross all the worse for it. Moreover, insufficient nourishment deprives the animal economy of the power of resisting some of the causes of disease, to which others may be exposed with impunity. Exposure to cold, for instance, with depressed bodily powers, may bring on fatal inflammation. Any morbid tendency existing in the constitution will probably cease to be latent. Tubercular consumption is both more frequent and more rapid in the insufficiently fed. Heart disease may also be developed, especially if a constant state of emotion is aimed at, in addition to fasting.

It is not intended to recommend people to weigh their food. Every one can, it is firmly believed, find out very easily whether he is habitually eating too much or too little. No rule can be laid down to suit all cases. It would have to be varied according to the age, size, and habits of each individual. If we discharge our duties with alacrity, we do not

suffer after eating, and do not get unwieldy ; and if we sleep lightly, we may be satisfied that we have hit the mean. It would be easy to quote the diet-tables of the army and navy, but they would supply no standard for general use. If space permitted, the cases of Cornaro and of a Mr. White might be given, who both supported life and lived in health on a very small farinaceous diet. They are, however, both of them, exceptional instances ; and in attempting to imitate their proceedings, many would kill themselves for one who would procure the same results from the same mode of living. Let every one find out for himself upon how little food he can keep in health and vigour. If the attempt be made honestly, and for that very purpose, it will be very easy for a man to ascertain whether meat need be taken twice a day—whether twice in one meal—whether any stimulus be really required—or whether he is not better or just as well without either wine or malt liquor—and whether a full meal is necessary for supper. Everything which it is thus discovered that we can go without, it is certain that we shall do better without. Half the lesson of this life is, to learn “how to do without ;” and the manly determination not to absorb the powers bestowed on us in the mere digestion of food, but to take only just what is wanted to keep us up to our work, will tend to cherish a disposition to make greater sacrifices, and in more important matters. This is the best way of “keeping under the body,” as far

as relates to the matter of eating and drinking, for it is thus kept as a cheerful servant of the spirit, and not as a tyrannical and querulous master, always tormenting us about its sensations, and needing to be studied more than it is employed.

But this healthful temperance must be reasonable. To lay down a rule, and hold by it when it does not apply, is to be the slave of habit. A sharp walk on a winter's morning, or long exposure to cold, really consumes the fuel which keeps up our temperature, as we shall afterwards explain, and nature will signify the necessity of supplying it. It is not difficult to perceive, that the wants of the system are really greater in cold than hot weather. This is because, in cold, we consume more carbon to make animal heat. This fact gives the reason why the natives of cold countries eat more than those of tropical climates. A few ounces of rice daily will keep the Bengalee strong and well; while the Greenlander eats and requires many pounds of blubber and train oil. The spare allowance of two ounces of rice a day for each man, improved the health of a detachment of European troops in India, and effected the cure of liver complaints in some of the over-fed officers; hot weather and inactivity making this small quantity sufficient, for they neither needed much carbon to maintain their temperature, nor were they using up the substance of their muscles and other tissues by exertion.

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On the other hand, the trapper of the backwoods, or the traveller who gallops across the Pampas, are using a severity of muscular exercise, which enables and requires them to eat flesh to an enormous extent. Cases of voluntary abstinence, with no muscular exercise, sometimes present themselves, to prove how little nutriment suffices to keep the animal economy going when its chief source of expenditure is stopped. The facts which might be detailed are numerous, but enough has been said to make it plain, that food must be taken according to the mode of life; less by the inactive and sedentary, if they wish to keep in health, and more by the laborious, if they mean to keep strong; more, in general, is required by men than women, more for everybody in cold than in warm weather, and more by the growing than the mature.

It was said, that our object should be to find out how little food will serve to keep us in health and strength. Even this rule must be applied with intelligent caution. The outward signs of good health include a fresh complexion and some roundness of outline. The popular judgment, that people are not in good health when they are thin and show their bones, when their faces look as if the skin were either transparent or muddy, is on the whole a true one. They may be able to do all that is required of them, either with mind or muscle; still there may be a condition in which the economy has less power of resisting disease than

it ought to have, and that is not one of health. Nutrition is an affair of supply and demand ; yet something more must be done than just to put in what will replace expenditure, and we cannot tell how much will exactly serve to do this. As it is best to have a balance at our banker's, while we are continually paying in and drawing out, so it is best to preserve something like a permanent fund of all that contributes to keep the body in good condition ; to have rather more than we mean to use of every thing ; larger and firmer muscles than perhaps are positively required for any work we put them to, and enough fat, at least, to prevent all remarks about "looking thin." This is the aspect of those who escape epidemics, or suffer least if they do catch them ; of people who can best sustain a sudden run on their powers of endurance, who do not easily get colds, and whose duties are accompanied by a sense of enjoyment. It is the sign that all is going on well within our bodies, that plenty of substance is being made out of our food for their repair, and that the old used-up material of our tissues is properly got rid of.

SECTION III.

ON DIGESTION AND DIET, AND MORE PARTICULARLY IN
RELATION TO KNOWN OR PRESUMED TENDENCIES TO
DISEASE.

IN order that digestion should take place, the food should be well chewed. The stomach will

not easily deal with it in the state of lumps. It must be ground and well mixed with the saliva, which flows into the mouth during mastication. Nor is this merely a mechanical operation. The saliva commences, upon a part of our aliment, the changes by which it becomes fit to enter into the composition of our bodies. Saccharine matters are partly converted into the oleaginous by the action of the organic secretion from the salivary glands; and the more the food is broken down and mingled with it, the more completely will this be effected, and the more perfectly and tranquilly will the office of the stomach be performed. Hence, the importance of preserving the teeth.

The entanglement of particles of food, which suffer decomposition in the heat and moisture of the mouth, is not only productive of one form of offensive breath, but the acids generated during this decomposition act upon and dissolve the enamel. Provided no tooth-powder be used, no young person will regret beginning the habit of cleansing the mouth by the ordinary means of brush and water, even after every meal, especially when meat has been eaten. It is certainly essential to do this before going to bed, for if it be neglected, we leave all that has collected about the teeth during the day, to go on decomposing during the night—the very idea of which is not pleasant. As the enamel is not renewed, and our means of beautifying it all act on the principle of friction, it follows that the brush should not be too hard, and

that no tooth-powder, which, however fine, must act just as sand-paper acts on iron, can be called positively safe. Even chalk is nothing more than the exceedingly fine powder of shells. It is a polishing powder, and produces whiteness and smoothness, at the expense of the surface of the teeth. Constant cleaning, even with powders that contain no acid, (which many much vaunted sorts do,) ends in wearing away the enamel of the front teeth, so that they look worm-eaten. The best substance is a little carbonate of soda, dissolved in the water. If, notwithstanding the constant use of the brush, the teeth are still discoloured by black incrustations, a powder composed of four parts of *precipitated* chalk, one of powdered myrrh, and one of powdered rhatany root, will be both efficacious and safe, if used occasionally. Where indigestion is habitual, there is commonly an acid taste in the mouth, which is especially felt in the morning. It would be desirable to put into the mouth a little of the *precipitated chalk*, before going to bed, in such cases. It is perfectly tasteless, and will remain in the mouth during sleep, to correct the acid, and thus save the teeth.

One great occasion of the decay of teeth is their being too crowded together, owing to want of expansion in the bones of the jaws. This causes them to overlap, and particles of food are then exceedingly likely to be caught and held between them, and in situations where the tooth-brush cannot easily get at them. The

result of this, and partly perhaps of the pressure, is, to produce caries between the teeth, which is its most common seat. The loss of one or two teeth in childhood would, very probably, have allowed the interval between the remaining ones to be wider; and those who can afford to pay for competent inspection of the teeth of their children, might save them from this cause of decay. When, however, the teeth are gone, or are so dilapidated that thorough mastication of food is impossible, the cost and inconvenience of false teeth are abundantly repaid by the recovery of the means of mastication.

The food, having been broken down, is passed by our voluntary act within the grasp of the muscular tube, which conveys it to the stomach, by contracting upon it. In the stomach it is reduced to a uniform pulp, by the action of the gastric juice. The process is aided by peculiar movements of the muscular fibres of the stomach, like those of an earthworm, which insure the exposure of all the particles it contains to the gastric juice, and finally expel it through the orifice of the pylorus into the tubular part of the alimentary cavity, where it is to be subjected to further chemical and vital processes. The pylorus dilates on the contact of food which has duly undergone the natural action of the stomach, but refuses passage to that which has not, whether the failure arise from want of gastric juice, or the indigestible nature of what has been swallowed. In either case, what has been eaten remains in the circumstances of

warmth and moisture most favourable to its decomposition, and thus gives rise to various disagreeable symptoms, well-known to the dyspeptic and the epicure.

Food that has properly undergone the preliminary stage of digestion within the stomach, is called chyme. In this state it is further mixed with and acted on by the secretions of the liver and the pancreas, and with the mucus of the alimentary canal. It is not exactly known what changes these fluids effect upon the chyme. Both the bile and the secretion of the pancreas seem to dissolve oily and fatty matters, and prepare them to be taken up and used to supply the demand for such substances. The result of all the various agencies to which the chyme is subjected, is to form a fluid, partly composed of materials fit to be taken into the system, and partly of useless matter incapable of assimilation. The separation of these two kinds of components seems to be one office of the bile, which combines with the latter, and by stimulating the fibres of the intestines to contract, provides for its eventual expulsion from the body; while the former is absorbed from the intestines in the course of its progress, to undergo the further changes which are required to fit it for entrance into the current of the circulation, as blood.*

This is not meant for a full account of the processes which qualify food to enter into the

* If this volume should stimulate that laudable curiosity, which it can hardly be expected to satisfy, the reader is recom-

composition of our bodies. When once it is committed to the stomach, our control over it ceases, and the most minute acquaintance with the changes it is to undergo will not help them forward. The advantages to be gained by an acquaintance with the chemical theory of alimentation, as at present accepted, are rather doubtful, and it is quite certain that the whole of this volume would be no more than sufficient for a mere summary of what might be said on the subject of diet. But there is, perhaps, nothing to regret in this unavoidable omission of much that it is customary to advert to on the subject. The principles which are of most value are of much older date than the philosophy of diet and digestion. They are also of much easier application than any rules which have a strictly scientific origin, and though they may be founded only on the long experience of mankind, they are now capable of a scientific justification. Dietetic precepts, based on a deep acquaintance with animal chemistry, are required by some people, and the state of their health warns them, for the most part, to consider themselves patients, and implicitly to follow the advice of those who are competent to prescribe. This book is not intended to make every man his own doctor. Indeed, the writer has considerable hesitation about giving additional currency to dietetic mended to procure a volume devoted to the subject of Animal Physiology, in the "Popular Cyclopædia of Science," where he will find the conclusions of the latest research and observation, lucidly and precisely explained.

subtilities. For instance, it would only puzzle the great majority of readers, to caution them against taking more carbon into their systems than is really required for the generation of heat, and the maintenance of respiration. But they would understand that saccharine and unctuous substances are the things which make them bilious, because they take more of them than is used, the liver being consequently thrown into disorder by the excessive work imposed on it in getting rid of the superfluity. In like manner, it would be of little avail to caution one person in five hundred against introducing too much nitrogen into his body, that is, more than he really consumed in activity of mind and muscle. This may be the danger of a diet too highly animalized; but the notion most profitable to lodge in the mind is, that too much meat, too rich a diet, is the way to breed gout and gravel, and still more certainly to call into action hereditary tendencies to these plagues of existence; and that, to make "good living" safe, hard exercise and plenty of perspiration must be habitually courted.

These pages are intended to furnish individuals with practical suggestions, and where it has appeared that they would be rendered more efficacious by unfolding the reasons upon which they are grounded, the plan has been adopted. In the present division of the subject, such a course would be likely to divert the reader's attention from what is of far more importance.

It is the privilege of health to partake in moderation of almost anything and everything, not only with impunity, but with advantage; and the suggestions, whether of advice or caution, which seem most calculated to secure this condition, form the main substance of our chapters. If this prerogative of easy, unconscious digestion, is enjoyed in any fair measure, the scrupulous casuistry about digestible dishes will seldom be much thought of or required. Health depends on many things besides diet. The stomach is a sort of corporeal conscience; and if the general condition of the system has suffered from neglect of such principles as we have endeavoured to enforce throughout the whole volume, the loss of digestive power, even before the failure of appetite, will, very likely, be amongst the earliest remonstrances to which we shall have to listen. If the habits are reformed, and the indispensable conditions of physical health are diligently attended to, one of the surest signs of success will be, the release from any necessity to think much about digestion. The way in which we have seen that appetite and the readiness to digest food are produced in harmony with the wants of the system, shows that the stomach is designed to be the grand sympathizer with all the other organs, and removes any wonder that the loss of digestive power should be just as often the effect as the cause of a departure from the state of good health. When it is the effect, medicine bottles and pill boxes, and the severest

code of dietetic prohibitions, will avail little, unless the primary causes of the evil are detected and rectified.

Still, it is true that health may be injured and completely destroyed by what is taken into the stomach, and that the errors and sins of eating and drinking are, of all sources of disease, the most prolific and the most general. Man is omnivorous ; that is, the range of substances which his organs are able to assimilate includes almost every kind of aliment employed by all the inferior creation—the tissues and seeds of plants, the flesh of beasts, birds, and fishes, reptiles, and insects. This, however, is only true of the species man, for almost every distinct nation has a different diet, which is adapted to its nourishment, because it is adapted to the whole set of circumstances which influence its physical state. The natives of burning India could neither eat nor subsist on whale-blubber, and the Esquimaux would perish with cold upon a diet that yielded so little fuel as rice. In our position, in a temperate zone, midway between opposite extremes, both as to climate and mode of existence, a diet to which almost every class of nutrient substance is made to contribute, becomes not only wholesome, but, to a certain degree, requisite. But, where is the individual who can indulge in unlimited freedom, and can go on eating whatever he likes, guided only by his palate, without, sooner or later, paying a severe penalty ? The immediate consequences of throwing into the stomach what it is incapable

of dealing with, are often serious enough, and may even destroy life ; for if the stomach sympathizes with the general system, it still more promptly makes every organ and function sympathize with itself. Then, there is the danger of impairing the faculty of digestion, and thus vitiating at the outset the long process which is to turn food into the proper elements of nutrition. Even if the stomach should perform its part, the further stages of assimilation may be frustrated by the unfitness of the materials which are subjected to their action. The nerves which line the whole alimentary tube are insensible to the presence of what is becoming fit for absorption into the blood, but much local distress arises from the contact of matter that is incapable of such conversion, and the diseased actions which spring from irritation reflected to other parts of the body are very numerous.

Before a few words of direction and caution are offered as to choice of diet, it may be remarked, that perhaps but little value is to be set on mere precepts of this kind. Plenty of muscular exercise, if possible in the open air ; sufficient employment of the mind, but not to exhausting fatigue ; sufficient relaxation, but not idleness ; the just medium of sleep ; cleanliness of the person, the dwelling, and the neighbourhood ; a contented and well-ordered mind and a quiet conscience, especially on the only right foundation, reconciliation to God by loving faith in Christ ; and abstinence from all poisonous and exhausting indulgences—such

is a brief and nearly a complete summary of the means of being in good health ; and appetite and good digestion wait on health. These particulars form the texts of all the other chapters of this book ; and it is because so many will not, and so many cannot secure these for themselves, that the question, " What may I eat ? " becomes so importunate for an answer.

It will be observed, that we proceed to give what appears to be the most useful kind of reply, without enlarging on the general principles of diet. These are of great importance in forming the diet tables of large bodies of people in public institutions, prisons, unions, and the army and navy. But, in spite of what is now ascertained about the " nutritive principles," the great majority of people must exercise their discretion on the food which is customary in the class of society to which they belong. The suggestions we have to offer, if honestly applied, will, it is believed, answer the double purpose of averting the pains of indigestion, and of guiding the reader to a wholesome diet ; and, in the course of our remarks, there will be opportunity to say something on the character of the food which is best adapted, both generally and in relation to particular constitutions, to preserve the body in health, and save it from disease.

The two most fruitful sources of evil, in the matter of eating and drinking, are, assuredly, the indulgence of the palate and neglect of personal experience. We have before admitted

that the palate must not be affronted—that it must even be gratified ; and that the food which is not relished will, for that reason alone, be difficult of digestion. Over and above the flavour which is attached to many of the nutritive principles, such as that which imparts its peculiar taste to meat, called osmazome, a natural instinct has been provided, which universally teaches man to mix with his food various substances which stimulate the palate. But the whole experience of mankind declares, that the simpler the taste—the less pleasantness of flavour is made to depend on admixture of substances which do not add to nourishment, but only gratify the palate—the more digestible and wholesome will be the result of the cook's labours. Almost all the substances which impart zest to seasoning, sauces, and stuffings ; the whole tribe of pickles, spices, and provocatives of all kinds, including sugar, are open to the double objection of being all, more or less, incapable of assimilation and digestion in themselves, and also of tempting us to mistake the pleasures of the table for the genuine demands of appetite. The contact of stimulants with the coat of the stomach is only attended with salutary effects up to a certain point. Beyond *that*, the afflux of blood which they occasion does not help the secretion of the gastric solvent, but suspends it, and approaches, even if it does not reach, the state of inflammation. Natural hunger is the best sauce ; but there will be no reason to fear any evil conse-

quences from condiments, if used in moderation. Still, there is constant danger of losing sight of this limitation. Once allow the gratification of the sense of taste to supersede the real purpose of eating and drinking, and the sensation must be maintained in the desired intensity, by continually increasing the dose of what excites it. Pickles, sugar, and spices are added, as if they could possibly form part of the staple of the diet.

The great rule of safe eating is simplicity. Not that the diet need be restricted to very few articles, for, though health and strength may be maintained out of a very confined range of alimentary substances, yet a rigid simplicity, in this sense of the word, is not necessary, and if it were, it would be vain to urge it on the world at large. What we do wish to recommend is, simplicity in distinction to unctuous richness and strong flavours, and to be most sparing in the use of precisely those viands which are most relishing. We are aware that the suggestions we have offered will not satisfy the kind of people for whom they are most necessary, and many will think the whole of what has been said too obvious to require printing in a book ; but it is the chief value of such advice to be obvious and of easy application. We have only been recommending the virtues of temperance and self-denial ; and these, when exercised at meal-times, have contributed to make mankind healthy and long-lived, ages before science could justify the reasonableness

of such advice. A long list of dishes, in the order of their presumed digestibility, would very likely be more acceptable, for what people of weak digestion and small self-control wish for, is some authority to partake of what they like. But such an assorted catalogue can only be fallacious. The caprices of the stomach are endless when it is capricious, and when it is healthy, its predilections and antipathies cannot be foretold. Even mutton sometimes acts like a poison.

After all, everybody is constantly engaged in a course of experiments on his digestive powers, and each one's personal experience would yield him the exact directions required by his particular case. If the resolve to abstain entirely from whatever had three times been followed by flatulence, "repetition" in the mouth, pain in the stomach, or unusual languor and oppression, were manfully kept, no one would fail to discover the viands which disagreed with him. This simple rule, and that of habitual moderation as to quantity, both as regards the whole meal, and any one of its components, would prevent nearly all dyspeptic symptoms, as far as dyspepsia depends on diet, and would save a world of curious questions about salted and smoked meats, pork, veal, and lamb, fried dishes, charred fat and outside cuts, stews and hashes, soups, (objectionable, because they are *diluted* aliment, independently of their usual indigestible ingredients,) new bread, salads, green vegetables,

rich puddings, pastry in general, cooked cheese, preserved, and especially dried fruits, sweet and acescent wines, clammy and badly brewed beer, and whatever other articles are deservedly under suspicion of being the least digestible of the food ordinarily taken. With respect to vegetables, it must be remembered, that for the want of them scurvy may be induced on land as well as at sea. There seems to have been a reappearance of this disease since the failure of the potatoe. But green vegetables are, perhaps, most useful in preventing it. Now, the same kind of abstemiousness which would avert indigestion, will tend to make food ultimately profitable to those who seldom suffer any immediate inconvenience from what they eat. The sort of diet which is, generally speaking, unfit for dyspeptic people, is not the best for any; and the list above given sufficiently points out its nature.

It is not necessary, nor would it be desirable, to avoid such things entirely, if it were possible, which to many persons it is not. That would be the way to develop a morbid delicacy of stomach, which it would be a great disadvantage to possess. A man may withdraw himself, not only in the matter of eating and drinking, but in other respects, from one thing after another, till what is naturally the excitant of healthy sensation and action in other people, becomes a poison to him. Thus, a too exclusive simplicity of diet would absolutely lessen the powers of the stomach. The votaries of a system of

regimen, just now very popular, are not to be congratulated on having rendered themselves liable to injury from even a cup of tea, which to the rest of the world is a refreshing and wholesome beverage. Apart from the case of confirmed or constitutional dyspepsia, which may demand the rigid application of the rule of personal experience, the reader can judge for himself whether he habitually prefers the sort of viands we have alluded to; if so, it may be fairly inferred, that he eats for the pleasure of eating, and the risk he runs will be two-fold. He will most likely take many things which cannot possibly be digested or assimilated, and what is assimilated will be out of proportion to the real wants of the system.

When food has duly entered the blood, it runs through the following circle of changes: that portion of it which is of the same chemical composition with the living organized tissues is appropriated by them, and after thus forming part of our bodily structure, it is, as the necessary condition of functional activity, again metamorphosed into its simplest elements, and redelivered up to the blood, to be eliminated from the system by the organs of excretion. Carbon, hydrogen, and oxygen, in the forms of carbonic acid and water, being thrown off by respiration, while other effete materials of nutrition (which contain nitrogen, in addition to the simple elements just named) are expelled in the various excretions of the liver, kidneys, skin, etc. Another portion of assimilated ali-

ment, which contains no nitrogen, such as the vegetable substances which are allied to sugar, starch, and the various juices, fibres, and tissues of plants, and oleaginous matters generally, whether derived from vegetables or from the fat of animals, only enter into the composition of one tissue, the adipose, or fat, and are chiefly used as fuel to generate vital heat, and to carry on the process of respiration, and these reissue from the body again as water and carbonic acid.

Now, when none of the various organic elements are supplied in greater quantity than is used in the manner above described, the nutrition of the body will neither be embarrassed by the superfluity of the plethora, nor will the organs of elimination be over-worked in freeing the system from what cannot be used, because it is not wanted. If, on the contrary, the materials of nutrition are accumulated beyond the natural demand, the liver and the kidneys are especially liable to suffer from the task imposed on them; or, failing to be removed from the system, these organic principles may undergo chemical changes within the blood, which will constitute the very matter of many diseases. Of these, gout furnishes the most signal, though by no means the only example, the morbid substance being deposited about the joints, and the chalk-stones, as they are called, often become visible through the ulcerated skin. The tendency to this disease is not always the effect of individual indulgence, for

it is often a lamentable inheritance from a man's forefathers.

The young, who have not already created a necessity for stimulating diet, by having used it for a long time, may reasonably hope to cut off the entail of this part of their patrimony by a sparing use of animal food, especially in those forms of it which are rich and stimulating to the palate. And there is all the more reason to avoid anything which disturbs the digestion, and causes rising in the mouth, as well as the habitual use of either sweet or acescent beverages, whether they contain alcohol or not, for the generation of acidity in the alimentary passages seems to precede a more copious formation of the matter of gouty disease. Muscular exercise to perspiration is also more incumbent on persons whose immediate ancestors are known to have suffered from gout, because this, more than anything else, leads to the natural elimination of what would otherwise remain in the constitution, to form the injurious combinations to which we have alluded.

Speaking generally, a full, nutritious, and generous diet is only needed, and can only be safely employed, by persons whose habits of active exertion, and, consequently, of expenditure, both demand such an amount of aliment, and also produce the conditions under which it will be duly disposed of. The pale, flabby, and languid, who exhibit in their persons, or may know that they inherit, a tendency to scrofulous complaints, should also be supplied with

food in the shape most fitted for immediate incorporation with their bodily structures, for they have not the same powers of assimilation that are possessed by more robust constitutions; therefore, meat and bread, to which should be added a due allowance of sound malt liquor, will be the sustenance most suited to them. On the other hand, the florid, the choleric, those who readily get stout, or are subject to headaches and prone to sleepiness, and not disposed either to mental or muscular exertion, while their appetite remains in full vigour, had better satisfy it, at least to a great degree, on vegetable food, and the less nutritious of the farinaceous articles of diet, of which rice is the most familiar example. Fish substituted for flesh meat twice in the week, total abstinence from stimulating drinks, and an occasional fast, as absolute as may be consistent with the preservation of the temper, will give them elasticity of mind and body, and ward off many evils to which they are exposed better than any direct recourse to medicine.

Man has been called the cooking animal, because almost every substance on which he is nourished requires the application of heat to make it available; and the most important part of the art of cooking consists in bringing food to the state which prepares it for mastication in the mouth, and solution in the stomach. There is no room in this volume to say much on the subject of cooking, but as wholesome

meat is so often rendered both indigestible and innutritious by the fault of its preparation, it will not be lost time to call attention to one or two chemical facts, on the neglect of which this chiefly depends. The perfection of dressing meat is to cook its juices, without losing them, and without hardening its fibre. Broiling must be considered to fulfil these conditions most successfully. The outside of the meat is thus exposed to a sharp heat, which corrugates its outer stratum, and hermetically seals up the nutritive juices. If the process be stopped in time, these are retained, and the fibre left tender. If the heat which is to cook meat be applied by means of water, instead of putting the joint into cold water, which is then brought and kept up to a bubbling temperature for so many quarters of an hour as there are pounds of meat, and twenty minutes over, as the cooking-books advise, the true plan would be to put it into boiling brine for the first few minutes. This would expose the outer part to a temperature much higher than boiling water, and it would, consequently, be hardened, so as to prevent the escape of the contained juices. The remainder of the time the temperature of the water should be kept much below that of boiling, (simmering water is boiling water;) this would prepare the whole interior of the joint for the palate, without providing trouble for the stomach. The tenderness and digestibility of Dr. Kitchener's hashes depend on their not being exposed to a heat greater than what

raises them to an edible temperature. But it will be long before thermometers are introduced amongst culinary apparatus; yet they could not be more usefully employed than in making wholesome cooking the rule and not the exception. Over and above wholesome cooking in all its branches, it is necessary that the materials of aliment should be good of their kind, for the diet may be unwholesome in this respect. But it would occupy too much space to do more than just call attention to this particular.

The water which is to be drunk may be injurious to health by its excessive hardness, which is owing to the quantity of salts which it naturally holds in solution. The formation of urinary calculi is common in some parts of England, from the character of the springs in this respect. A little inquiry would soon ascertain whether this danger required to be guarded against, and in that case a pure and pleasant water could be procured by filtering rain-water through sand and charcoal. Owing to the foulness of the source—for example, the Thames, which seems to be nothing better than a huge sewer—by the channels of supply becoming infected with drainage impurities, or by the decomposition of sedimentary matter in cisterns and tanks, water becomes charged with the very active poison of decaying animal and vegetable substances, which the very nose can sometimes detect. In a case which came

to the writer's knowledge, several families were brought into a condition of great sickness, and actual fever was set up in some of their members. As the situation was good, and their general circumstances favourable to health, the real common cause of so much constant mischief was not at once detected. But it was found, on investigation, that a drain had leaked into the well from which the common supply of drinking water was procured, and when this was remedied, all recovered their health and strength.

Space will not permit us to spend much time on the various forms of alcohol which enter into the diet of this country. There will be another opportunity of speaking about the disastrous consequences of the undue use of stimulants. At present, we only notice them as they are considered to be useful and necessary means of support, which, no doubt, they often are. "Take a little wine for thy stomach's sake, and thine often infirmities," is still very salutary advice for many people. But the necessity for stimulants is more frequently fancied than real, and the way of experiment previously suggested is the only sure mode of determining the question. If any individual discovers, by abstinence, that he can do without them, he will be greatly the better for abjuring them entirely. It has been proved over and over again, that the severest fatigue and the greatest exposure are best borne without any recourse to stimulants, and that the health of the habitually

intemperate will not suffer even from the sudden and complete withdrawal of intoxicating fluids, the exceptions to this rule being found mostly in cases where active disease has to be encountered. Let the reader engage honestly in the praiseworthy attempt to find out what is the *least* amount of stimulating drink under which he can preserve his health and spirits, and not how much he may take without immediate injury, and he will require nothing more to guide him in the employment of either wine, beer, or spirits, bearing in mind that well-fermented, unsweet, and well-hopped beer, ranks first in the gradation of wholesomeness, and that spirits are quite at the opposite end of the scale. Nothing more than this can be needed by any one who is not already an invalid, and in good earnest desires to consult expediency in the use of such things. A volume might be filled with illustrations of the mischief which arises from the use of stimulating drinks, when beyond the real requirements of the system, but this chapter takes it for granted that the reader does not contemplate employing them for the sake of their intoxicating effects, and in that case the little we have said ought to be enough; only in trying the experiment, we recommend sufficient time must be allowed to make the result really decisive.

CHAPTER V.

ON PURITY OF AIR.

RESPIRATION, WHAT IT DOES, AND WHAT IT REQUIRES—
EFFECTS OF DEFICIENT VENTILATION—SOURCES OF
IMPURITY—PRACTICAL SUGGESTIONS—PROOF OF THE
EXTREME IMPORTANCE OF PURE AIR.

CARBONIC acid is abundantly generated in the processes of life, and the chief provision for preventing its accumulation in the blood, is the exposure of this fluid to the air during respiration. The extrication of carbonic acid is not the only event which occurs in breathing, for the same physical law that effects this necessary object, occasions the introduction into the blood of one of the constituents of the atmosphere, namely, oxygen, which is essential to the manifestation of all the most important modes of vital activity; and in the words of Dr. Carpenter, "it is in the two processes conjointly, and not in either alone, that the function of respiration essentially consists."

The combination of the oxygen, thus admitted into the blood, with the carbon of the tissues, forms carbonic acid, and produces their decomposition. It is during the activity of the ner-

vous and muscular tissues, there is reason to believe, that this consumption of carbon and formation of carbonic acid is most abundant.

Moreover, a certain temperature is essential to the activity of all the vital processes, and this is maintained by the disengagement of heat, which accompanies the combination of oxygen with some of the elements of food, an effect precisely analogous to ordinary combustion. These elements are carbon and hydrogen. The combustion of the first adds to the amount of carbonic acid which requires to be got rid of. Thus, the support of life, the energy of function, and the evolution of heat, are all attended by the union of carbon and oxygen, and all the carbon which thus assumes the gaseous form of carbonic acid, is to be expelled from the system through the instrumentality of the lungs—for we need not dwell at present on the other mode of its elimination by the skin, which, nevertheless, does occur.

All that the lungs contribute to the function is a surface of permeable membrane, through which the necessary exchange of gases can take place. The windpipe, which communicates with the external atmosphere through the mouth and nose, divides and subdivides within the substance of the lungs, into tubes of exceedingly small calibre, and these open into clusters of cells. On the surface of these cells ramify the capillary vessels, which are the ultimate divisions of the arteries and veins of that lesser circulation of the blood, between

the heart and lungs, which fits it to be reissued by the general circulation to the whole body, after undergoing the changes which are effected upon it in respiration. The minuteness of the capillary streams in which the blood is thus exposed to the air, and the fineness of the membrane which alone intervenes between the atoms of the blood and the atmosphere, may be inferred from the fact, that the lungs afford about six hundred millions of such cells as we have just mentioned, through the walls of which the aëration of the blood is accomplished.

We purposely abstain from much that might be said in explanation of the mechanism, the nervous agency, and the chemistry which are concerned in carrying on the function of respiration, because such information, however interesting, could not be turned to a practical account. But the main facts of the chemical part of the process cannot be too well known, and the following may be accepted as a sufficient account of them. The atmosphere is a mixture of oxygen and nitrogen, two gaseous forms of matter, and both these ingredients contribute to the maintenance of life, though it does not seem necessary to make any further reference to the part which nitrogen sustains in the economy. About four per cent. of the quantity of air admitted into the lungs in each respiration undergoes the following change:—It loses so much of its oxygen which passes *into* the blood, and its place is supplied by a rather less amount of carbonic acid, which passes *out of*

the blood into the air cells, for we have seen that more oxygen is required than merely suffices to form the carbonic acid. The same phenomenon of interchange, through a membrane, would happen out of the body. It is the consequence of a physical, and not a vital force. The apparatus of the lungs only furnishes conditions for its occurrence more perfect than can be imitated by artificial contrivance.

The quantity of air required to support respiration varies according to the age and size of the individual, his state of health, etc. It only concerns us to say, that it will be greatest when he is actively employed, and when there is the greatest demand for the generation of animal heat. The two demands co-exist during muscular exertion, as everybody must have felt. On the widest average that can be made, a room six feet square, and less than eight feet high, would contain all the oxygen required by a middle-sized man in twenty-four hours. But were he confined in such an apartment, and all communication with the external atmosphere stopped up, he would die of suffocation long before all the oxygen of the air was exhausted, because the more carbonic acid he expelled from his lungs, the more unfit would the air become to perform its part in the air cells of his lungs. The interchange of gases, which is the only thing that makes breathing of any service to us—if we may express a physical law in the language of metaphor—depends on the mutual appetite between the blood and the

atmosphere for what each has to yield. If the air has already received carbonic acid beyond a certain point, it may be breathed into the lungs, but no more carbonic acid will pass out of the blood through the walls of the air cells, nor will any more oxygen leave the air to enter the blood. The conditions of this vital barter between the atmosphere and the blood have been destroyed, and the exchanges cease; whereas, could the carbonic acid be removed from the room as fast as it was expired, the man might remain alive in the chamber till he had used up all the oxygen it contained.

In the case supposed, the individual pent up in so many cubic feet of air would not die at once. His muscular power would fail for the want of the oxygen, which we have seen is necessary to its production. For the same reason, his mental faculties would become obscured; and, besides this, the retained carbonic acid would act as a direct paralysing poison on the functions of the nervous system, and on the substance of the heart. The whole mass of his blood would become venous, for the arterial vessels will not circulate the dark carbonized blood which the veins collect from the whole body, unless it has been purified from its carbonic acid, and its scarlet colour has been restored to it by respiration. Circulation would become suspended in the lungs themselves from this cause, even if the movements of respiration preserved their vigour. But that part of the nervous centre on which they depend

would also be paralyzed. While these events were happening, he would pass through headache, faintness, and drowsiness, into stupor and insensibility, and then all the functions of life being brought to a stand-still, death of the whole organization would ensue.

This is the course of events when people sleep in closed rooms, with stoves burning. The oxygen is used up so much the faster to support the fire, while carbonic acid, which the combustion of the fuel produces, quickly saturates the confined atmosphere, and life is destroyed in the way just described.

Whenever such accidents happen, everybody is very much shocked, but more or less of the same effect of the deprivation of fresh air is constantly endured in workshops, school-rooms, studies, sitting-rooms, and sleeping apartments. If life be not extinguished, energy is destroyed, and life itself is shortened most materially by the depression of the vital powers.

To form an adequate conception of the extreme importance of ventilation, where many people are crowded together in workshops or schools, it is necessary to be aware, that the air which is to be respired becomes contaminated by other substances besides carbonic acid. The volume of this gas alone is very great—a full-grown man exhaling in twenty-four hours a quantity which represents about eight ounces troy of solid carbon. In addition to this, there is the vapour of the breath, which is water containing in solution a proportion of animal

matter, which is capable of passing into offensive putrefaction. Volatile impurities, the result of mal-assimilation of the food, also fly off with the breath, as is often made evident to the senses. One of the first symptoms experienced by the occupants of the black hole at Calcutta, was a profuse perspiration. This agent also, to a certain extent, contributes to render the air impure under the circumstances we are now considering. The inmates are all suffering the effects of partial suffocation. Tailors and sempstresses stimulate their flagging energies by gin or porter, or the school-children are scolded and punished for stupidity, when the true remedy would be found in some means of carrying off the results of respiration, and the other poisonous vapours, and admitting the fresh air. Use, and, perhaps, the blunted sensibility which attends insufficient respiration, prevent the occupants of such rooms from perceiving their closeness, though it immediately strikes and staggers any one who enters them suddenly from the external air. He cannot draw his breath, and begs for an open window. But every aperture that can be discovered has been stopped up to keep out the cold, because the natural combustion within the body, which would maintain its temperature, is prevented by the inability to receive oxygen, which we have before accounted for, and there is no other way for them to keep warm, except by preventing their bodies from cooling.

It is true, that the mode of ventilating crowded rooms, without chilling the occupants

by the indraft of cold air, may still be called an unsolved problem. The current of air into an apartment and up its chimney which a fire occasions, secures a great degree of ventilation ; but, as warm air is lighter than cold, and therefore causes the respired air to rise, the inhabitants of a room with a fire in it may have their heads immersed in vitiated air, while their feet and legs are chilled by the passage of pure air towards the burning coals. Dr. Arnott's balanced valve, let into the chimney near the ceiling, is found to answer the purpose of removing the upper stratum of air, because it yields and opens towards the chimney on the slightest atmospheric pressure in that direction, but is closed by any indraught from the chimney itself. But, then, the draught of air up the chimney must be sufficient to produce some suction of the valve towards the chimney. Defective chimneys, or a site which occasions a downward pressure of the external atmosphere upon their upper apertures, which will happen when the building is placed close to taller structures, or to rising grounds, and the wind is thereby thrown into an eddy above the house, will deprive this ingenious contrivance of the conditions necessary to its perfect action. Whatever means may be employed, (and we cannot afford to do more than inculcate the necessity of some means or other,) they must be founded on the facts, that warm air rises and cold air sinks, and that it is the warmest air which contains the greatest amount of impurity.

About one-third of human existence is passed in the sleeping apartment ; and, in the case of the great majority, their circumstances are never so injurious to health as during the hours they are shut up in their bed-rooms. The room inhabited in the day-time is generally ventilated by the fire and the draught up the chimney, and by the frequent opening of the door, and its furniture is not so prejudicial to the circulation of air. But the bed-room remains unopened for hours together ; most of its vents are carefully stopped up to exclude the air, because it is cold, and the space around the sleeper is often still further circumscribed by curtains and testers, till the couch of repose resembles a funeral catafalque. When the room itself is large, these ugly contrivances convert the bed into a closet. A canary bird, suspended at the top of such a bed, within the curtains, dies suffocated in a few hours. But the atmosphere of the whole apartment, long before morning, becomes highly mephitic, from the consumption of its oxygen, the formation of carbonic acid, and the exhalations from the lungs and the relaxed skin. The occupant sleeps heavily, and awakes pale, languid, and unrefreshed, for the system has been oppressed, not only by the poisons which such an atmosphere has forced it to retain, but, most likely, by the re-admission of much that had been discharged by the breath ; for the lungs are organs of absorption as well as of exhalation. Sleep, in such circumstances, partakes of the nature of insensibility ; it would have been

lighter, shorter, and invigorating, had there been provision for an adequate supply of pure air, and the removal of what had become contaminated. With the present construction of houses, some draughts into the bed-chamber should be courted, for if fresh air keeps coming in, foul air must be continually going out. All that need be cared for is, to prevent a cold current from playing on the face, which can be easily managed by choosing a good situation for the bed, or by a single curtain suspended from a rod along the ceiling.

We have spoken of the ill effects of what is popularly called "breathing the same air over again," as those of partial suffocation; but, bad as these must be admitted to be, the real injury to health is founded on the obstruction to the processes of nutrition which is thus caused. It may not be easy to explain to the general reader how this comes about. The fact is certain, that to breathe impure air disposes to the formation of a material which is not fit to enter into any of the proper structures of the body. As we took occasion to observe in a preceding chapter, the presence of this in the blood is the essential character of the scrofulous habit; and its deposit in any of the organs of the body constitutes the disease itself. More than two-thirds of the mortality of young children has been ascribed to this cause alone. Whatever depresses the powers of life, whether it be bad or insufficient diet, misery or vice, tends to produce this depravation of the fluids and solids of the body. As to this morbid effect of

vitiating air, one illustrative instance is as good as a thousand, if the reader will but perceive what it proves. The monkeys of a certain menagerie were found to die rapidly of tubercular (scrofulous) disease of the lungs. As they were natives of hot climates, the mortality was supposed to arise from cold, and measures were taken to warm their apartment. But, unhappily, the means employed only rendered the ventilation still more imperfect, and the creatures died faster in the warm but impure air than they did before, and all of them from tubercular deposit in the lungs.

Especially ought such precautions as have been dwelt on, to be used in the case of persons known or suspected to be the subjects of consumption; that the matter of the disease may be kept at a minimum consistent with the preservation of life. Perhaps animals resemble plants in exhaling more abundantly in darkness. The writer is confident that the bed-room of the consumptive can be distinguished by its peculiarly heavy and oppressive atmosphere in the morning. It is not unlikely that a morbid matter has been copiously passing off from the lungs of such individuals during sleep, and provision should be made, not only to save the system from its reintroduction, but to facilitate its removal from the economy, by preventing saturation of the medium which receives it. Airy, well-ventilated bed-rooms should be regarded as amongst the most important necessities of life to those who are supposed to be liable to this fatal complaint. Whether we

seek to prevent the disease or to keep it latent, no means will be so effectual as plenty of pure air, and especially during the night.

The damp, dark, unventilated cellars, which so many living beings are still permitted to inhabit in our large towns, exhibit in perfection the effects upon organic health, (and very principally in the production of tubercular diseases,) which are due to cold and saturated atmosphere, deprival of light, and want of fresh air. Without light none of the functions of nutrition or growth will prosper. The evolution of the tadpole into the frog is prevented if the animal be kept in the dark. The narrow street and confined dwelling are prejudicial to health, not only because the air is pent up, but because the blessing of light is scantily enjoyed.

The fact that the lungs are organs of absorption as well as of exhalation, shows the importance of ventilation in another respect. It is not only the interests of the nose which are consulted by freeing our dwellings from all sources of disagreeable odour. There are, doubtless, volatile poisons that do not reveal themselves to the sense of smell, and yet are generated wherever human beings dwell congregated together; and to keep the atmosphere of a house sweet, may give us good reason to think we have dispersed them. The absence of unpleasant smell is no certain test that the air is pure. Care must be taken to render it so, and then the sense of freshness may be taken as proof of the fact; but bad smells are in nine cases out of ten the natural indication of effluvia which are noxious

to life. It may be possible to overcome this salutary warning by the predominance of odours which are not disagreeable, as is often practised, on occasion, by burning brown paper, or scattering scorched vinegar. We may even destroy it altogether, and yet leave the real foe in full activity. There are substances now in vogue under the appellation of disinfectants. If they really deserve the name, it must be because they act chemically on the cause of the fœtor they suppress, and some of them may fairly be supposed to do this. But nothing deserves to be trusted to, that does not remove the necessity for employing such means at all. Refuse matter must not be allowed to collect ; the house drainage must be attended to ; the situation of some of the sources of contamination must be changed, and the perfect ventilation of the dwelling must be secured. If yet some offensive vapours cannot be avoided, they may be rendered comparatively imperceptible and harmless by diffusion in the abundant supply of fresh air, which finally carries them off. There should be stated times for "flushing" the house and each room in it with air, by opening windows ; and the inmates of such unfavourable places should, at least, take care to "flush" their own bodies once every day by exercise in the open air. If none of these obvious expedients are found to be effectual, the rich should consult their surveyor, or change their residence ; and the poor man had better betake himself to the model lodging-house, or, at any rate, increase the demand for such establishments, which many of

the opulent might envy for the healthiness of the accommodation they afford.

Many sources of atmospheric impurity unhappily cannot be obviated by individual effort. The want of proper public drainage, the deficient supply of pure water, the neighbourhood of centers of contamination, and the very density of the population in proportion to the area, may, each and all, render the district in the highest degree unfavourable to health; and yet the necessity of getting a living may compel people to stay where life itself is constantly in danger, and is almost sure to be shortened. Such localities abound in diseases, which are the direct consequence of the constant inhalation of aërial poisons. Fever, the most common and most widely fatal of all, has been held to have no other origin. If this be not absolutely true, there can be no doubt that such circumstances predispose the system to contagious fevers. The man who lives in tainted air is always in a state of depressed vitality, and, therefore, open to the impression of any morbid influence whatever. If, therefore, it really is a man's duty to reside in the midst of such unfavourable influences, there is all the more reason for diligence in cultivating personal good health, and in making his own dwelling as wholesome as circumstances permit. It is impossible to say to what degree he might not thus succeed in counteracting all the external influences which are prejudicial to life. For these he is not responsible; but it may be taken for a general truth, that it is only when

they happen to coincide with other sources of bad health, which do lie most completely within his capacity to control or remove, that the evil consequences are fully brought into operation.

It may contribute to form a rational passion for pure air, if we close this chapter by a few of the facts which have been elicited during the inquiries into the causes affecting the public health; and they shall be confined to the effect of drainage on the duration of life.

In twenty streets, in Manchester, after they were paved and drained, the number of deaths per annum sank from 110 to 90.* In Leicester, the average deaths, in three years—

In streets where the means of drainage were rendered complete, were	1 in $24\frac{2}{3}$	} East District.
In those where the drainage was partially improved	1 in 20	
In those left in original condition	1 in $16\frac{1}{3}$	

In the West District the results were similar.

In those with culverted drains the deaths were	1 in $26\frac{1}{3}$	} On an average of three years.
Partly culverted	1 in 22	
Not culverted	1 in $17\frac{2}{3}$	

The proportion of deaths from epidemics, taking the streets in the same order, were—

One-quarter	} In the East District.
One-third	
One-half	
One-sixth	} In the West District.
One-fifth	
One-quarter	

* Reports on the Health of Towns, vol. i. p. 117, et seq.

In Wigan, the annual average proportion of deaths to population* was—

In well-conditioned streets	. 1 in 36	} Including all classes.
In ill-conditioned streets	. 1 in 29	

The attention of the reader is drawn to two of the Rudimentary Treatises lately published by Mr. Weale, of High Holborn—that on Drainage and Sewerage, and that on Cottage Building. They both contain much information, by no means difficult to apply; and the writer is glad to refer to such able compendiums to supply the unavoidable omissions of his brief chapter. It is one thing to show what advantages should be secured in respect to purity and warmth of dwellings, but a much greater space is required to explain the means.

* 2nd Report, vol. i.

CHAPTER VI.

ON CLEANLINESS AND WARMTH OF SKIN.

WHAT THE FUNCTIONS OF THE SKIN ARE—HOW THEY
MAY BE IMPEDED—MEANS OF KEEPING IT HEALTHY—
LIABILITY TO COLDS, ETC—EFFECTS OF DAMP AIR, ETC.

THE skin is the only one of the various organs which are associated in the common purpose of keeping the whole bodily fabric in health, that is not concealed from our inspection, and of whose condition we can judge by a glance of the eye. Indeed, everybody recognises the absence or presence of good health in other people, almost solely by the appearance of the skin. But, beyond this vague conception of its importance, which has no practical result, the popular notion does not seem to extend. And though it lies, so to speak, under our hands; and we can promote its prosperity more directly and surely than we can that of any other vital organ, the skin cannot be said to receive much attention in these respects. It is generally considered and cared for only as a matter of personal appearance, just as any part of the apparel would be, which was put on for life, and must be cleaned on the person, because it could not be changed. But this is not often done with punctilious regularity, except where the surface is left open to observation. Yet a

proof of the benefit of such cleansing of the skin is familiar to us in the fact, that horses are kept in good condition more through their skins than in any other way ; and every intelligent groom is aware, that he accomplishes much more by the currycomb and the other parts of stable regimen, than merely to give the animal a beautiful coat. Even pigs thrive best when some purifying discipline is employed on their skins, and the reason of such facts is not difficult to understand.

There is hardly an organ concerned in the constant operations of supply and removal, which are essential to the nutrition of the textures, in whose function the skin does not participate. It extricates carbonic acid, and admits oxygen as well as the lungs. It helps to dilute the blood, by its power of absorbing the moisture from the air, and to reduce its volume by exhaling the fluid of the perspiration. We shall see that it plays a very important part in maintaining the heat of the body, and its exhalation is the principal means of lowering temperature when that is excessive ; while, by the large quantity of solid substance contained in the perspiration, the skin assists other organs in discharging effete and injurious matter from the system.

If the skin fails to effect these purposes, it is never in a healthy state itself, nor can general health be enjoyed, for the consequences will not be confined to the skin ; some other organs will either be overworked in supplying its place, or the functions of all will be impeded, just as a piece of clock-work is retarded by

clogging any one of its wheels. Even when health may not have been lost through the fault of the skin, it can be cultivated and recovered by restoring the functions of this organ.

It would be a just notion to regard the whole surface of the body as an extended organ of transmission into and out of the blood, and, therefore, it is evident that the channels should be kept free and pervious ; and as no function can take place without the presence of blood, the vigour of our surface circulation should be promoted. These two points comprise all that we need concern ourselves about, with a view to preserving the general health by securing that of the skin. And the good offices which it requires at our hands do not involve much self-denial, for every claim which the skin has on our care is satisfied, if we keep it clean and warm. But the reward will correspond with the manner in which we understand and try to secure these two indispensable conditions of good health.

It is one of the highest marks of self-respect to cleanse the surface of the body from the atoms of all manner of substances which the atmosphere is constantly depositing upon them. But the worst sort of contamination is that which proceeds from the skin itself. It is almost always perspiring, either insensibly, as when the whole amount passes off in vapour, or sensibly, when the exudation displays itself in moisture or drops. The perspiration contains much solid, refuse matter, on an average nearly one hundred grains a day, and this cannot, of course, escape into air. Then the

true sensitive skin is defended from the irritating contact of the atmosphere in two ways, both of which contribute to the impurities we have to remove. An exterior insensible scarf skin is perpetually in course of formation. Snakes shed theirs once a year ; ours is always being shed and reproduced, the exterior layer continually parting in minute scales, which encumber the surface with scurf and powder, as we see in the case of the skin of the head. The other means of protecting the exquisitely tender structure of the true skin, is the exudation of an oily matter from innumerable little glands, whose ducts open externally. Thus, a film, compounded of whatever extraneous dirt may have attached itself to us, of the solid ingredients of the perspiration, and of the worn-out particles of the scarf skin, is always forming itself on the surface of the person ; and because it is blended with the lubricating unguent, soap is required for its effectual removal.

The clothes which are directly in contact with the skin of course absorb a great deal of this, and, therefore, as far as mere superficial cleanliness is concerned, the oftener the body linen is changed the better. When that comfort is not enjoyed, and the other means of personal cleanliness are neglected, a very foul varnish forms on the skin, which, if it were to become really impervious, would speedily destroy life. It is worthy of being noted, that the skin is not warmer for being coated in this undesirable manner. The experiment has been tried, of spreading a perfectly waterproof com-

position upon the skin of animals, and their temperature is found to fall rapidly ; they die quite as much from the loss of animal heat, as from any other effect. The reason is, that all action is suspended, and the molecular changes which take place in the formation of perspiration and the other excretions not occurring, the evolution of heat which would attend them is prevented.

This experiment exhibits very convincingly the importance of the skin to the health of the whole body, and vindicates its claim to be considered a vital organ. If the complete cessation of its functions destroys life, it must be plain that any constant obstruction, though only partial, will necessarily impair health. A very disgusting, yet faithful picture, might be drawn of the loathsome diseases which result from the accumulation of acrid filth upon the skin ; but it may be fairly supposed, that no one who is likely to read this book, needs such forcible stimulus to make him willing to do justice to his own integument. Yet even people who think themselves clean, would be surprised to see how much may be got off their surface, which has no business to be on it, by the thoroughgoing abstersion of a shampooing vapour bath.

But, however necessary all other means undoubtedly are to cleanse the skin, if we give it the opportunity, it is its own most effectual purifier. Soap and friction will remove all that is quite on the surface, and may be thought to free the mouths of the pores and the oil ducts from the concretions that stop them up,

but the flow of perspiration is the only way of washing out these minute canals themselves. Mr. Erasmus Wilson has satisfied us, that a man of average height possesses about seven millions of pores, and that the total length of tubing in this system of animal drainage is at least twenty-eight miles. We see now why exercise should be taken up to the point of inducing, at the very least, a sensible degree of moisture on the surface, for we thus obtain not only a proof that we have relieved and equalized the general circulation, but we enable the skin to secure its own permeability, and in purifying itself, to purify the blood also, by the activity of its excretory operations. This is the best vapour bath that can be taken, and nothing more will be needed, if regular ablution and proper change of linen be also enjoyed.

We must now consider the means of keeping the skin warm. During a great part of the year the skin is parting with its heat to a medium much colder than itself, and this unavoidable abstraction of heat is kept within the bounds of comfort by wearing clothes. A great deal might be said on the choice of textures for this purpose; but there is a common stock of knowledge and of common sense, on which we may fairly presume, and thus save the reader much prolixity of direction. It is well to remember, that whatever is in contact with the skin, should be a bad conductor of heat, because, as it is often wetted by perspiration, we have the cold produced by evaporation to provide against also; and, therefore, flannel, if the skin

can bear it, should have the preference for body clothing. The colour of the outward garments is of as much consequence as their material. Black absorbs the rays of heat, and is, therefore, a bad dress for the summer ; but, as it also radiates heat faster than light colours, it is also least proper for the winter. The fur of animals in the arctic regions is generally white, and this is a provision to enable their bodies to retain the heat generated within them; which is the only source from which their temperature can be maintained. In our hot weather, we are sometimes surrounded by an atmosphere of a temperature equal to, and even higher than that of our bodies, and then, also, white or light-coloured clothing is most favourable to health and comfort, for the reason stated above. Natural provision, however, is made against the injurious effects of too high a temperature, by the fact that heat is rendered latent when water takes the form of vapour. When the blood is attracted to the skin by heat, the exudation of perspiration is encouraged, and as its vaporization takes place more rapidly, the hotter and drier the air is, the very cause which heats our bodies produces the phenomenon that reduces their temperature. Human beings are thus enabled to remain in an atmosphere hot enough to cook a beef-steak without suffering, and even without much inconvenience. If, however, the air be loaded with moisture in addition to being hot, the skin drips with the perspiration which is not sucked up by the surrounding medium, and we feel oppressed, not because we perspire

more at such times, but because we cannot perspire enough. Some degree of the same thing is often owing to a heavy, thick coverlid to the bed. The air inclosed along with our bodies becomes hot and saturated with moisture, and feverish discomfort and restlessness are produced. Sleep will revisit us when we have thrown off the counterpane, which is unwholesome because it is impervious.

The sensibility of the skin in relation to temperature, affords a most significant index of the general prosperity of the vital functions. Heat is required for all the manifestations of vital force, whether in animal or vegetable tissues. The diminution of the actual temperature of our bodies below the requirements of the vital processes is, perhaps, the fact which we are informed of by the sensation called "chilliness." The feeling is in the surface, but the condition is general. This peculiar discomfort shows that the circulation of the blood is not equally sustained. The skin does not possess its share in the distribution, and, therefore, all its vital processes, and amongst them the generation of heat, are impeded; and if the skin suffer for want of blood, the central organs will labour under its excess. In whichever way the due relation between blood and organ be violated, the effect is the same, to disturb and interrupt function. Indeed, the three facts of circulation, heat generation, and function, are reciprocally causes and effects to each other. Circulation of blood is necessary to function, function is attended with the evolu-

tion of heat, and heat is the stimulus to function; and thus the living machine seems to enjoy an approach to the conditions of perpetual motion. However, the reader can understand that whatever tends to keep up a vigorous and equal circulation, will save him from the miserable feelings of chilliness, and in doing this will quicken all the powers of life within him. The comfortable temperature of the skin, habitually enjoyed, will be the criterion that these advantages have been secured. A full and equable circulation is not only the condition under which we have the greatest enjoyment of life and its powers, but it is the state which most successfully resists all the influences which produce disease.

The capacity of repelling disease should be included in the notion of health, for the occasions of disease are constantly operating on us, both from within and from without, and the healthiest people are precisely those who are least susceptible of being influenced by morbid causes, under which others succumb. One of the most frequent of such causes is the partial abstraction of our surface heat by currents of cold air, the wearing of damp clothes, or thin shoes, or other ways of catching cold. Much has been written to explain in what manner this produces the various ill effects which it certainly occasions. This is not the place to attempt the solution of medical problems, even if there were a reasonable hope of success. The symptoms of having taken cold resolve themselves into congestions or inflammations, at a distance from

the part which received the impression of cold. They are, with some reason, supposed to be due to the agency of the nervous system ; and there is a close relation between the consciousness of cold and the morbid effects it produces ; that is, those who feel cold most, will, generally speaking, suffer most readily from what is called taking cold. The causes must be constantly and unavoidably acting on everybody, but the bad consequences are well nigh confined to those whose power of generating surface heat is low, so that, when temperature is reduced, it is not at once restored, and thus the contact of cold produces a prolonged sensation of cold. Practically speaking, cold only does harm, as a general rule, when the forces of the circulation are depressed, whether this be an habitual condition, or an occasional state produced by fatigue, exhaustion, previous excitement, or indisposition ; and it is in these precise circumstances that there is least power of reaction. It is hardly necessary to explain a word so well known, and the meaning of which every one must have experienced, when, after suddenly plunging the warm hands into cold water, he has felt them begin to glow with more heat than before ; while, on the contrary, if the hands were chilly at first, the loss of their temperature by the immersion has made them still colder than before. In the one case, their local circulation was vigorous, in the other languid. And it is the same with the circulation viewed as a whole. If it be sufficiently vigorous, the entire arterial system, along with the heart

itself, immediately resents and redresses the displacement of blood from the surface by cold, and the current flows with a fuller and more rapid tide, and, consequently, with a more complete and equalized circulation of the blood, after the temporary check.

It is evident, that to establish a habit of reaction, is the best way to arm the system against the effects of cold, though this is only one of the advantages which the health will receive. This is the chief, if not the only reason, why cold bathing is found to be so great a tonic; and it is so, only when it is conducted so as to secure reaction. It must not be used when the surface is chilly, nor even when it is heated, if that is accompanied by fatigue; for in these cases the conditions necessary to reaction are wanting. In the first, the heart is already over-weighted with blood; in the second, it is tired, and either state will diminish its power of recoil. But when the warm bed is left in the morning, the skin is well supplied with blood, and the powers of life are recruited, and the most feeble constitutions may with perfect safety invite reaction by the general application of cold water to the surface. No time should be lost in standing about unclothed, but before the skin has become chilled, whatever the sensations of cold may be, the operation should be set about in an energetic manner. Robust people may pull the string of a shower bath; but in general, almost in every case, it is better not to be passive. Reaction sets in much more readily

if the muscles are called in to aid in inviting the blood to the surface, and this may be managed by the brisk use of a firm flesh-brush for a few seconds, just before applying the water. The suddenness of the impulse of the cold water has a great deal to do with the benefit. But sufficient "shock" can be procured by employing a large coarse sponge, such as is used in stables, for it will deluge the skin very amply, and the friction it produces will promote the access of blood to the surface. The pail of water should be set on something which will remove all anxiety about wetting the floor by the process. The bather should keep on vigorously, quickly filling and squeezing the sponge over his shoulders, arms, back, and the rest of his person; for the harder he works, and the more thoroughly he drenches the surface, the sooner will the delightful and exhilarating sensations which accompany reaction, reward his courage and perseverance. It is quite possible to stop too soon, and only be chilled by the operation. The criterion of doing it sufficiently is the comfortable glow which comes on while it is proceeding.

It may be necessary for weak people to raise the temperature of the water in the winter time, but it must be sensibly cold, or it will not serve the purpose. Those who are accustomed to the practice will enjoy it most in the coldest winter. Every third or fourth morning soap should be used after the first wetting, and the bathing continued to wash it off; and these will be the mornings when the after sen-

sations will be the most agreeable. But comfortable warmth, good spirits, and appetite, may always be expected to follow. Nor will the benefit be transitory. The blood once in the skin will stop there, and the circulation will remain equalized during the day, to the advantage of every function in the body.

Of late, a great deal has been said about what is called hydropathy, as a curative and invigorating regimen. It does certainly excite the skin to profuse excretion, and when an idle and luxurious life has accumulated much recrementitious matter in the vessels of the body, it is not denied that this complicated process of soaking and bathing may have its use, especially as it is combined with pretty severe exercise and a judicious diet. But the effects do not differ from those which are induced by a vapour bath. The Russian plan of exciting the skin to profuse perspiration, by a shower of light blows from the branch of a shrub, while the body is exposed to heated vapour, and then corrugating its textures by a sudden affusion of cold water, secures all the benefit which can be got by the mysterious and cumbrous proceedings of hydropathy. Such baths have been instituted, by public authority, in some parts of Prussia, and have been found very conducive to health. Rheumatic tendencies seem to be counteracted by their use, for they free the system from what appears to be the matter of the disease, and diminish the susceptibility to cold. At any rate, they are much safer than the hydropathic plan of playing at battledore

and shuttlecock with the blood between the outer and inner surfaces of the body. It is good to establish the habit of reaction, and we have shown how it may be done safely and effectually, and more is not necessary to keep people in health. But to experiment upon this too far is to impair it, and Dr. Priesnitz' patients do often die from its loss. The skin becomes congested and covered with boils, which are absolutely welcomed, and the discipline is continued till some analogous result happens in a tissue, where it proves fatal. But human nature will submit to any arduous and severe remedies, now and then, especially if they cannot be understood, rather than allow a rational care of the health to govern the general course of procedure.

It is chiefly through its effects in stopping the proper action of the skin, and lowering the general temperature of the body, that damp air is so destructive to health. Other reasons were stated in the last chapter for leaving dwellings, with rooms so low pitched and so ill arranged as to hinder ventilation. Such places are almost sure to be damp. Disease constantly besets their inhabitants, and remedies are of little effect in removing it. Children, as might be expected, are the readiest victims of all the influences we have alluded to ; and it is scrofula, in some of its many forms, that will render them sickly and shorten their lives. Even when the abode itself is unexceptionable, the same consequences will result from its situation in low levels, valleys, or near large surfaces of water.

CHAPTER VII.

ON REST, ECONOMY OF POWER, AND ON SLEEP.

MUSCULAR FATIGUE—WHEN TO BE CONSIDERED EXCESSIVE—PREVENTION OF DEFORMITY—FATIGUE OF ATTENTION—EXERTION OF MUSCLES AND MIND TO BE PROPORTIONED TO THE “POWERS OF THE CONSTITUTION”—WHAT MAY BE EXPECTED WHEN THEY ARE NOT—EDUCATION—PRECOCITY—TWO SENSES FOR THE WORD “CAPACITY”—IMPORTANCE OF ECONOMIZING POWER IN PREVENTING OR ARRESTING ORGANIC DISEASE, AT ALL AGES—REST AND RECREATION ARE DUTIES—PHYSICAL ADVANTAGES OF THE SABBATH—SLEEP, WHY NEEDED—AN ATTRIBUTE OF HEALTH—MEANS OF RESTORING THE HABIT WHEN LOST—CONDITION UNDER WHICH SLEEP TAKES PLACE—AMOUNT REQUIRED—EFFECTS OF EXCESSIVE SLEEP.

ONE portion of this volume has been occupied in the attempt to make plain and evident the general truth, with respect to the organs by which all our functions are performed, that *use keeps them in repair*. In the present chapter some illustration will be given of another principle, not less important, that *repose prevents them from wearing out*.

It is by no means inconsistent, to press both these maxims and their practical applications with equal urgency, for both are founded in the facts of our bodily constitution, and to neglect either one or the other, entails the sufferings and disabilities of loss of health. Advice must

always wear the appearance of inconsistency, when mistakes are likely to be made in two opposite directions, and where no middle path of safety can be exactly described, which will suit everybody, or anybody, at all times and in all circumstances. It is true that, for the most part, the practical rules founded on these two principles, are required by two very different sorts of people, and that much perverted ingenuity is used in misapplying them. The inert, or self-indulgent, defend the unhealthy habits of their lives, by quoting that one of the maxims which they by no means require; while the excessive exertions which are prompted by laudable ambition, and stimulated by success, whenever they are supposed to require excuse, may, perhaps, seek their justification in an equally unreasonable appeal to the other. This cannot be helped. The care of the health is a branch of morals, and no mortal can be saved the trouble of finding out, by a little honest good sense, what, to him, is the course of prudence and duty. Both body and mind are as susceptible of injury, by undue demand on their powers, as by neglecting to employ them sufficiently. Something has already been said about the necessity and benefit of employing the *muscles*, and there will be opportunity to show that the exercise of the mind also leads, both directly and indirectly, to the enjoyment of health. But in these times of competition and unprecedented activity, there are strong temptations to an injudicious and extravagant expenditure of strength. One of the most valu-

able kinds of economy is often forgotten, that which makes the powers of body and mind go as far as possible. It is certainly more dignified to wear out by friction, in the activity of praiseworthy effort, than to become rusted and clogged in useless idleness. The one is a mistake, while the other is a vice. But in the present state of existence, mistakes are often more severely and immediately punished than many kinds of sin. We are treated like beings who can and ought to get wisdom and understanding, and to be guided by them. And however worthy the motive, no motive can be strong enough to justify the habitual transgression of any of the laws of our being, though it be only the physical, for nothing short of a miracle can save us from paying the penalty.

We shall, therefore, proceed to consider repose and economy of power, in reference, first to the muscular system, and next to the nervous system, and principally that part of it which is the instrument of the mind.

The contractility of muscles depends on the sufficiency of their structure; but the more they contract the more their tissue is consumed, therefore prolonged action of muscles leads to the exhaustion of their contractility. During the rest of inaction, nutrition repairs the wasted tissue, and restores to it the power of contracting. Muscular exertion should, however, never be continued till it can be carried on no longer, or, indeed, anywhere near this point. The sensation of fatigue is the sign to us that our muscles are losing this faculty of contrac-

tion, in the way just explained. The legitimate employment of our muscular force, either in duty or for the sake of healthful recreation, should stop short of inducing absolute fatigue ; for, without doubt, a sensation which deserves to be so called, does warn us that we have done rather too much. It is better to feel equal to more than we actually do ; and this for the sake of the muscles themselves, for they may be so exhausted as not only to require a longer interval to qualify them for renewed exertion, but even the vital forces which carry on the nutritive repair may be interfered with, and have their character altered to what is called inflammation, with pain, and swelling of the limbs.

It is rarely, indeed, that this happens ; yet it is possible, for there are temptations to perform feats of strength and endurance, in rowing, climbing mountains, and innumerable other ways, which are often followed by some degree of it. The stiffness and trembling of the muscles more particularly called into action, for some days afterwards, show that they have been put on such tasks too suddenly. If they had been gradually enlarged and strengthened by a short course of preparatory training, they would have accomplished all this, and more perhaps, without subsequent debility.

If the exhaustion extended no further than to the organs immediately employed, there would be no great harm done, beyond losing time while they became fit to resume their office in a vigorous and healthy manner. But the bodily functions, and the organs which execute them,

are a co-partnery, and extravagant expenditure on the part of one, has a tendency to produce bankruptcy of the firm. At present, we shall only assert the facts as a warning, without stopping to show either how true it is, or how it is true. Such occasional excesses generally occur during the period of youth, when the consequences are not likely to pass unobserved, and they attract all the more notice because they are occasional. What is more to be guarded against, is the habitual overtaking of the whole muscular system, which we shall consider in a subsequent page, along with some other ways in which the duty of economizing power may be neglected.

There is, however, one exemplification of the evil of being ignorant that muscles, as muscles, need rest, which it is worth while to notice. It is impossible here to give minute and particular directions about all possible cases. It must suffice to explain principles, and if that can be done, their application will suggest itself whenever occasion requires.

In the education of young girls, it is very properly attempted to give them straight and upright figures, and to prevent the habitual attitudes of the body from being ungraceful and repulsive. Happily, the discipline of stocks, backboards, and high chairs, is well nigh exploded, for it had the necessary effect of inducing the very deformities it was intended to counteract, or others quite as unsightly. The human body, it is quite true, is, in a sense, highly plastic. It does admit of being stretched

by pulling, and flattened by pressure ; but no crooked spines or humped backs are ever cured in this mechanical way ; it only increases the deformity when the treatment is at last left off, and the patient attempts to go about like the rest of the world. There is no other mode, either of curing these, when they admit of cure, (and some kinds do not,) or of preventing their occurrence, but by strengthening the muscles to which has been allotted the duty of maintaining the natural form of the body by supporting the skeleton. We are only concerned with their prevention, and not only on the ground of appearance, but because very few of these deviations from the agreeable in form, are unattended with inconvenience and obstruction, to organs and functions which are essential to health and long life.

As far as regards the acquisition of the power of walking properly, and avoiding ungainly attitudes and postures, education may certainly do a great deal, just as the drill serjeant converts the awkward ploughman into the soldier. But the young lady, whose tastes and feelings are educated, will be led by her instincts to study the becoming in gesture and carriage, and will catch it by imitation of what she admires and sympathizes with in her associates. No contrivances of callisthenic exercises will supply the want of this, although they may be of great advantage by promoting the habitual endeavour to render the gait and movements of the body graceful. But it must be borne in mind, that the very muscles which carry the

frame erect, must be allowed to repose. After an hour spent in carrying a weight on the head, or brandishing the clubs, the pupil must not be set to her studies on a high stool, or a hard bench without any back. For, if the muscles of the spine are not permitted to rest themselves as nature dictates, they will take rest for themselves in the way least desired. If no support for the back is allowed during the hours of study, the muscles that are intended to keep the spine straight, will not be able to support the column of joints. That task will be thrown on the ligaments which bind them together, and the whole series of pieces which compose the spine will take a certain set—one curve being commonly towards the right shoulder, and the other to the opposite side lower down. The ligaments are all the time being stretched, and the muscles weakened. This goes on, day after day, till a permanent curvature is detected by the flatness of one side of the waist, and the bulging of the opposite shoulder-blade. This is not the place to point out the means of cure, which, nevertheless, is quite possible in nineteen cases out of twenty, provided the discovery be made in time, and really competent advice be procured ; for the writer feels bound to caution parents against some plans of cure which are only too much in vogue. Cure can only attend a treatment, in which sufficient exercise of the weakened muscles is succeeded by sufficient repose. Perfect and constant rest in the recumbent position, where no disease exists, will only make matters worse. Whatever improvement

may seem to result, it rapidly disappears when the reclining couch is deserted ; for muscular structure when never called into exercise loses its character, and becomes replaced by tissue, which is not capable of the function of muscle.

Plenty of exhilarating exercise, especially in the open air, in games that require skill and activity, will form, for all purposes, the best discipline of the muscular system, and do more to confer and preserve a well-developed shape, and a graceful management of the person, than nine-tenths of the plans that are enforced.

It has been observed, that the sense of fatigue indicates that the muscles are approaching the limit beyond which it is not desirable to employ them. This feeling is referred to the muscles ; but it is questionable, whether what is often meant by the word fatigue, is not rather a mental than a muscular sensation, which denotes fatigued attention, and follows strenuous and prolonged action of the will, and that *effort* of mind which it involves. Fatigue, in this sense of the word, can of course be only experienced in connexion with muscular contractions which obey the will. The voluntary muscles themselves, when the will does not act as the stimulus to their contraction, are capable of long-continued action without the consciousness of fatigue supervening. For example, in some of the cases termed hysterical, it is not so very unusual to see an unnatural movement of some part of the body kept up by the voluntary muscles for days together, and with great force and rapidity, and yet the patient does not com-

plain of fatigue, for the movements do not depend on the will; and other illustrations of the same fact might be adduced in abundance.

We have only to set our muscles to acquire some new aptitudes, to teach them to associate their contractions in the precise way which will effect some new purpose of skill, such as playing the violin, or performing some of the feats of the juggler, to make us sensibly aware that the word fatigue has more than one meaning. Yet these feats of dexterity are not, in themselves, more difficult than the act of rapid writing, or the extremely difficult art of walking on two legs, which consists in preserving our balance, while we alternately throw the body forwards with one foot, and hinder its fall by advancing the other. This, and all the other accustomed movements, once required the same pains of education, which are now forgotten. We have only, when once the habit is gained, to form the will, and the several muscles which are required, at once contract to the necessary degree, and our purpose is immediately executed. But, when we put our limbs on fresh and difficult tasks, great pains must be taken before we arrive at the power of doing them with the same sort of unconsciousness of exertion, which characterizes those combinations of movements which are already learned. Every step of the process is attended with a sense of effort, every failure compels a closer attention and a more vigilant effort of volition, and this is felt to be excessively fatiguing, and to have no proportion to the mere amount of muscular contrac-

tion which is taking place. It is this, perhaps, which makes us wonder and applaud when we witness feats of rare and extreme dexterity. We recognise the determined energy of purpose and perseverance that must have been employed to enable a man to perform them. We forget that he kept steadily in view the charges for admission, which were to enrich him when he had rendered himself a proficient, and therefore did not in reality feel the pain and fatigue we suppose him to have conquered, being saved from it by what was to him the sufficiency of the motive. And a sufficient motive will, and often does, in ordinary life, save people from thinking about, and therefore from feeling fatigue, which the same labours, undertaken without it, would have made irksome and insupportably fatiguing. The languid lady, whom "the least exertion tires," is often capable of a great deal, when she likes, in the gymnastic exercises of the ball-room, or, more respectably, in the service of a sick child or husband.

In all ordinary exertion we are saved the fatigue of our attention. In walking, for instance, we are not compelled to give heed to each, or indeed to any of the necessary muscular acts which are comprised in it. We will to commence the series of muscular contractions, and they are repeated with all the regularity of rhythm. Absorbed in thought or conversation, the act of walking requires only an occasional effort of attention, and an occasional stimulus from the will, when we have to direct our steps, to keep on the edge of the curb-stone, or to

pick our way through impediments. In the main, our conscious attention, there is good reason for thinking, is released from all besides a readiness to assist or superintend. But when the muscles themselves begin to be fatigued, that is, when their contractility is becoming exhausted, the stimulus of distinct volition is brought to bear on them, and almost every single step is accomplished by determination. The capacity to make the muscles go on contracting, is very often the necessary ally of great enterprises, and under the appellation of "pluck," or "spirit," is more often the subject of much misapplied applause. But unless a man be in that perfection of physical condition which is induced by high training, he cannot thus force his muscular system beyond its strength with impunity. That method of preparing for severe exertion is very principally successful, because it confers extraordinary powers of turning food into good blood, so that there is an abundance of material always ready in the system, to replace the expenditure caused by muscular effort. If all the functions of nutrition are in good order, there is no occasion to be anxious about the effect of tolerably severe exercise, for example, in athletic sports in youth.

But it must be remembered, both by those who have the charge of the health of young people, and also by those who have charge of their own health, that capacity for muscular exertion, the power to get benefit and not harm by severe and prolonged efforts in walking, boating, and so on, is relative to the state of

the organic health; and there is happily one very obvious test, which will inform us whether we may indulge ourselves freely in these ways, and this is the hardness of the limbs. When the powers of life are vigorous, and nutrition is proceeding satisfactorily, from the digestion in the stomach to the universal maintenance of all the structures in the body, the muscles are always disposed to contract. An influence from the spinal marrow is always exerting itself on their fibres, and keeping up a tendency to contraction. This is what is called tonicity, and is the cause of that firmness which is felt when the limbs are pressed in one's grasp. The delicate youth, whether his complexion is absolutely pale, or of that flushing redness which may be mistaken for health, will not exhibit much of this, and he should be warned against excessive fatigue. The reasons of the caution will be presently explained and enforced.

We have been occupied with the muscles which obey the will; but those which are employed in the service of organic life, though the fact is not signified to us by the sensation of fatigue, can be exhausted. We have formerly seen, in the chapter on exercise, that the activity of our voluntary powers draws with it that of the involuntary. Whatever the organ whose activity is determined by our own choice, whether the muscles or the brain, its functions depend on the supply of blood, and the heart must, therefore, contract with greater force and rapidity when they are in action. Death often begins at the heart from the labour which it un-

dergoes, having exhausted its contractive power ; and any excessive and long-continued demand on the powers of the circulation will weaken them. The signs of the weakened heart are rather for the medical attendant to detect and advise upon ; they are not such as can be very readily appreciated by the general reader. It is, however, useful to observe, that it is both necessary and possible to have a strong heart. Whatever will strengthen the voluntary muscles, will invigorate that muscle, as whatever weakens them will also make the heart weak. It equally participates in the benefit of blood, well made, out of the most healthy kinds of food ; and though never idle, will profit in its nutrition by that diminished action which stands it in the place of rest.

The mention of such facts as this, affords a fit opportunity to resume our attempt to give the reader some idea of the mutual inter-dependence which exists between all our functions, and how it is that they mutually sympathize with each other. To do this more plainly, it will be convenient to speak as if there were only two classes of functions, those which serve for the maintenance of organic life, and those which are the instruments of animal and intellectual life. By means of the first, the food is changed into blood, the blood is circulated and also purified from the noxious products of functional activity, and thus the whole fabric is preserved in a state of integrity and fitness for its work. They proceed independently of the will, but their end and purpose is to afford the con

ditions of activity to those organs of the second group, the brain and the muscles, which severally manifest and obey the acts and feelings of the mind. It is evident, that on the health and vigour of the first class, must depend the vigour and capacity of the second. And we have now to show, that whatever acts prejudicially on the organs of mind or motion, impairs and injures the health of the whole body. We have already said something of the evil effects of neglecting to employ the voluntary muscles ; the following description of what often occurs will exhibit the fact, that health may be destroyed by whatever overtaxes either the brain or the muscular system.

One man, let us suppose, gets his living as a postman, or in any other way which compels him to do the same unvarying quantity of work with his muscles every day. He was not a strong man to begin with, and he goes on feeling over-fatigued every night. He suffers from indigestion, and what is called derangement of the bowels, and becomes emaciated, pale, and weak ; his legs swell, and he looks haggard and dejected. He has been for some time unable to change his food into good serviceable blood, and now an additional warning is given by total loss of appetite. The same assemblage of symptoms present themselves in another man, who has been using little more muscular exertion than sufficed to bring him to the scene of his labours, and to take him home again. But his brain has been actively employed in business, while his mind is possibly harassed by some great cause of sorrow and anxiety. He has no

comfort in the day, and perplexity and grief drive sleep from his pillow at night. Neither of these men is far from breaking down completely—the first from overwork of his muscular system, the second from the wear and tear of thought and feeling. The result is in both cases the same. The functions of reparation are debilitated. Both are on the verge of acute disease. The dangerous ordeal of fever may have to be passed through, or some weak part of the body may suffer so much from interference with its proper nutrition, that it becomes the seat of inflammation.

There are various ways in which this similar result from dissimilar causes may be accounted for. In fact, the immediate causes are not really dissimilar. In both instances, there has been excessive expenditure of material. In the one case by muscular action, and what we have seen that involves ; and, in the other, by the processes of thought, and what uses up structure still more, in the prevalence of emotion. And if what all functions need, has been diverted to the separate use of a few, the remainder must suffer. The blood required by both muscular and mental action, has been made to yield up the elements of structure disproportionately to the capacity of reproducing them from food, and as blood is, in many ways, necessary to the formation of blood, the more impoverished it is, the less likelihood is there that it will be duly replenished with nutrient particles by what is taken into the stomach. If we suppose that the postman was half-starved, an improved

diet might have saved his health. In like manner, could the digestion of the man of business have been preserved, his health might not have given way. Power is generated out of nutriment; and it comes to the same thing, whether this is inadequately supplied, or not properly acted on; whether there be deficiency of fuel, or a stove which will not burn it.

Now, as the actual manifestation of all functions depends on the interaction between the blood and the structures, and as the blood is elaborated from food, that portion of our food, supposing it to be properly assimilated, which is over and above what is needed to maintain the healthy bulk and weight of the body, represents what is consumed in functional activity, and thus becomes, or may be viewed, as the correlative of the power exerted. In this chapter, we confine ourselves to the functions of mind and muscle, though there are other sources of consumption. It would be absurd to suppose, that we should therefore be always adjusting the quantity of food to the daily quantity of work. What is here meant is, that the organic power to elaborate healthy blood, and to keep it healthy by the means which have been provided for the constant depuration of the fluids and solids of the body, is very exactly proportional to the capacity of exerting our faculties without detriment. If the function of an organ can only be made to exert itself to the extent we wish at the expense of injuring its own organic life, or impairing the general power of nutrition, that organ ought to be

called weak ; and this is often recognised, though too often forgotten, for we often hear of boys of great capacity, "who are not capable of much exertion," either in study or sport ; so that, in relation to health, there is a popular and loose conception of power among people of discernment, which we may usefully adopt in this part of our subject.

It will reach the apprehension of the general reader, who has no previous acquaintance with physiology, to treat the matter in the metaphorical style, which accords with common speech. The practical truth may thus be taught, though the scientific truth is couched under similitudes and imaginary suppositions ; and for practical and ready guidance, it is a very good way of conceiving the notion we wish to inculcate, to look upon it as if there were a certain capital or amount of power, which admits of being expended wisely, and with due regard to all the claims that must be satisfied—or extravagantly, on one mode of applying it, to the disappointment of other demands. We may employ it on the muscles, and not leave enough to maintain the energy of the brain, or enough for the processes which keep the whole body in health. The brain may be permitted or compelled to use it up in study, and the consequences will be seen in the failure of the general health ; or, what is worse, these consequences do not make themselves visible to uninstructed eyes, so as to lead to a timely change of procedure. One of the effects of unwise and unequal diversion of power—of

spending it on the intellectual to the deprivation of the vital functions—is, that we may hinder, not so much the formation of blood, as of blood that is healthy, and fill the arteries and veins with materials unfit to enter into the structures of the body, which, nevertheless, do get deposited in them. This constitutes scrofula when it happens in the glands, the skin, or the joints, and is the cause of consumption when it takes place in the lungs.

Moreover, the very organ which has been allowed to monopolize power, in our present sense of the word, may, and most likely will, itself suffer in consequence. All activity of function involves action of the capillary circulation of the organ which displays it—the more function, the more blood. When this circulation has been too great or too prolonged, one or other of two liabilities may be incurred; the least of these consists in collapse and debility of the local circulation, so that the necessary supply of blood no longer visits the organ, to enable it to act with energy; or, the temporary excitement, which ought to be governed by the law of intermission and repose, acquires a tendency to become a persistent condition; and then there is danger of change of structure, and of the organ being rendered useless, by losing that condition of its tissues which is absolutely necessary to its function. And it is in this state of persistent excitement of its blood-vessels, that the morbid material we have just spoken of, if it exist in the blood, is likely to be deposited in the structure of the organ.

The first liability is often exemplified in the experience of students, especially of those who work at night. The mind is resolutely applied to the subject of study, until it seems to glow with pleasurable excitement, and to exert itself spontaneously—positive enjoyment superseding all sense of effort. This is taken for the natural reward of strenuous endeavour. To a certain extent, perhaps, this is true; but, if it be followed by vigilance, and the mind be unable to let the subject drop, so as to sink into sleep, the individual has been doing, perhaps, too much for anyone—certainly too much for him. He has brought on a state akin to exhilarative intoxication, when the powers of the mind seem to be heightened instead of obscured. If headache, with throbbing temples and flushed face, should not afford him plain warning of the condition of brain he has induced, he will most likely find himself in the morning, in spite of the most conscientious endeavours, unable to get his mind fairly engaged about anything which requires fixed attention. A dull uneasy sensation oppresses his head; his face is pale, and an universal languor and inaptitude for exertion, with a sense of dejection that will not yield to the strongest motives, will point out to him that he has not acted wisely. To get the most out of the mind, in the long run, the powers of the organ must be accommodated. No time is really gained by such agonistic efforts. The brief and profuse expenditure of power compels a long and tedious period of retrenchment. Our forefathers would have

called this the exhaustion of the animal spirits ; and one evil possibility is, that the individual is tempted to have recourse to stimulants. Green tea is resorted to at night, because it seems to help the kind of excitement which is desired ; and some kind of alcoholic drink is taken in the morning, because it seems to remedy the consequences, and does really relieve the sensations, and appear to reinstate the powers. If, however, there should be no danger of being seduced into the immoral reliance on stimulants, still if such kinds of application as we have been referring to are customary and continued, the high degree and the fellowship may be obtained, but ten years later there is nothing to distinguish the man from the common herd. His brain has lost its aptitudes, and the only reasonable purpose of early application is frustrated.

Analogous effects follow undue excitement, when the intention has been to experience emotion, rather than to exercise thought. Many cases of religious melancholy have no other origin, it may well be suspected, than this over stimulation of the brain in certain kinds of devotional habits. The theological mistakes involved in them cannot be enlarged upon here. Let the suggestion be applied by those whom it concerns, for the health of body, mind, and soul, may be injured by its neglect.

The commonest occasion of forgetting that organic health may be lost, and life itself put in hazard, by immoderate and disproportioned demands on the mental faculties, is in the educa-

tion of youth, especially when precocity tempts the experiment of "pushing," as it is termed. In the majority of instances, precocity only demonstrates that there is a tendency to disease ; and is often little, if anything, more than a symptom of what must be considered a form of disease. There is too great facility of excitement, and, therefore, liability to some of the consequences before mentioned ; to organic debility, and exactly the opposite state to precocity, namely, dulness, or to disease of the over-excited organ, with total obscuration of the faculties, and, perhaps, untimely death.

But the organic activity of the brain evinces itself by intelligence and powers of apprehension much beyond the common, and, perhaps, by tastes and dispositions of great promise. It seems very difficult to think there can be too much of such desirable qualities, or how it can be anything but a fault not to cultivate so fruitful a field diligently. Observation, and the records of individual eminence, will not be found to bear out this view of the matter. The greatest number of those who have done most in after life, have not been very, or at all, remarkable in their early years. They have generally excelled, at least as much, and often a great deal more, in sports and pastimes, which are only to be enjoyed by those whose organic health is vigorous, as in the tasks of the school-room. And they were happily allowed to do so. The union of mental endowments with strong health, forms the only rational ground to expect future distinction, and a long

and successful career. All other things being alike, the boy who excels in games and feats of strength and skill, is most likely to excel in more important ways in manhood. To develop the mind and let the bodily health shift for itself, is the way to get a plentiful blossom, but very little fruit. A late maturity is worth waiting for. If the child be really extraordinary, it ought to make it the more easy to wait with confidence for what time only can produce in perfection. The experiment of forcing, cannot safely be followed in education as in horticulture. If bodily health is not enjoyed by the grown man, his acquirements will be exercised at a disadvantage, if they are not rendered positively useless. The youths of the present time seem likely to produce a generation greatly surpassing its predecessors in capacity and acquirement, for they enjoy the benefit of wider and better directed studies. Some few very extraordinary minds will most likely be the result of the system. But no conclusion as to its effects on the generality can rationally be drawn, till observation has determined what these are at thirty or forty years of age. Many a tortoise, it may be suspected, will have passed the hares.

A clever girl, whose willingness to study equals the utmost wish of her instructors, is encouraged and urged to gratify the ambition of her parents. Her brain does all that is required of it, and a good deal more, for it will not go properly to sleep at night. She lies awake, or has painful dreams, or frightens her

friends by walking about in the partial sleep of somnambulism, and is frequently obliged to leave her books for her bed by headache. It is almost certain that the general health has been sacrificed, or is about to be so, though it may require a medical eye to discern the proofs. The functions of nutrition have been weakened, and perhaps vitiated, and if so, her habitually quickened pulse is only carrying the accelerated blood to her organs to afford materials for spoiling their structure. Sudden and frequent fits of complete fainting may indicate that the brain is already the seat of morbid deposit; or, after a few years, during which none of her bodily functions go on as they ought, the fatal cough comes on, which shows that the lungs have principally suffered. Even if no such catastrophe is to happen, all the signs of vivacity of mind gradually disappear, and the precocious girl is hardly to be recognised in the dull and languid young woman.

In the same family, there are often great differences in the capacity of bearing a high pressure education, without injury either to particular organs or to the constitution generally. No degree of it should be applied without having ascertained what the capacity is, in this sense of the word. Ability "beyond his years" may be welcomed and cultivated in a child who presents the unequivocal signs of robust health. All the boys and girls may enjoy good health, while some are strong and others are not. It is far more easy to see that children are strong, than to detect when

they are not. And before parents determine how they will proceed with the education of their children, they had better seek advice from the medical man who has watched the constitutions of their offspring from birth. If physical education proceed along with that of the intellect, as it may—if as much be done to procure large and firm muscles, vigorous digestion, and healthy assimilation of food, as to store the mind and discipline its faculties—education may not only be carried on safely, but will even be promoted. The brain of the clever but weakly boy will become stronger as his muscles become firm, and his skin ruddy and elastic. Secure the vital vigour of all the organs, and more work can be obtained out of that one we particularly desire to exercise. And in like manner, the most robust health may be wasted by overwork of the brain, for by oppressing and injuring one organ we injure all the rest. If, in the opinion of a trustworthy adviser, culture of mind and body cannot go on together, the latter is always to be preferred to the former. This will only postpone, in order to insure, the expectations which the opposite plan would certainly destroy.

One more caution seems worth mentioning, before we dismiss the subject of education in its bearings on health. It might often be discovered, that the boy who is distressed by the attempt to apply his mind to one branch of study, would exhibit aptitude in prosecuting another. He is dull, and gets a headache over the Latin grammar, and the *Selecta e profanis*.

But there may be some department of knowledge, some exercise of ingenuity, some occupation for his intellect, on which he would display alacrity and ability, if only pains were taken to find it out. It might, for instance, be very possible to make a good civil engineer of the youth who would only waste his time, and that very painfully, on Greek plays. It is true that the chief end of educational discipline is not the cultivation of special aptitudes. The most useful people are those who do many things well, rather than those who do one thing excellently ; and it is not intended to deny, that the educational course which is most usual may be the best for the greater number, and that for the most part it answers the purpose of forming a general fitness and readiness for any particular study or profession whatever. The case of great geniuses, where aptitude rises to the faculty of origination, need not be specially provided for. They will always make themselves known in due time. And when such special endowment really exists, and is not merely fancied, there is all the more need that the other parts of the mind should be developed. Still it remains true, that one class of studies is not suited to be a discipline for all classes of minds. And it may be doubted, whether the rational purpose of education would not be attained for a greater number, if the discipline employed were made to fall in with and exercise the natural bent and tendency of the intellect.

What the mind does best it does most easily ; not, indeed, without effort, but the great labour

and effort is at first to get the powers fully engaged. When once the mind is kindled and lifted, so to speak, on to the line of rails, the consciousness of ability and the hope of success will afford the stimulus of an immediate reward to the onward prosecution of the task. Upon whatever branch of knowledge a youth has become experimentally acquainted with this result of vigorous application, he has learned a great lesson. The natural tendencies of the mind are towards a capricious vagrancy in search of the faint pleasures of mere amusement. Education seeks to form a disposition towards the determined pursuit of what is to be stored up for future use—to convert the butterfly into the bee. Now, the habit of resisting temptation, of sustaining exertion, of thinking of only one thing at a time and for some time together, would, it is supposed, be most surely attained by a course of study that does not absolutely set at naught the fact of diversity of aptitudes. There is as much thought required, for instance, to understand and give an account of the mechanical and chemical laws which are exemplified in a steam-engine, as in rendering Tacitus into English; and many a boy is capable of the one kind of exertion who is not of the other, and if the mistake be made of keeping him at it, you lose the advantage of courage. Dispirited by failure and a sense of insuperable difficulty, he ceases to take any interest or to make any effort. Give the youth opportunity of convincing himself and others that he is capable of doing one

thing well, and he will have the better heart to apply himself to other studies ; and from whom is most to be expected in after life, but from those who have proved to themselves that they can if they will ?

The foregoing remarks are not out of place in this book, for, neglecting to comply with their tenor, it is firmly believed, is often the cause of mischief to health. Several hours passed in fretting, unproductive effort, will be followed by greater exhaustion of the powers, than would have resulted from their wiser application ; and in practice it is not difficult to distinguish the case we have been referring to, from that of simple idleness.

The principles which it has been the object of this chapter to enforce, admit of being stated and explained in more strict accordance with what is now known of the laws of the animal economy. The physiology of the nervous system alone, would show that a general superintendence over the whole bodily organization is virtually exercised through one of its departments, with the result of bringing all the several functions of the body into relation and sympathy with each other. But to make this the basis of the reasons for what we recommend in this chapter would be impossible in our confined limits. Many pages of exposition would be required to enable the reader to see the subject from the same point of view which is taken by the medical mind ; and, in point of fact, the mutual dependence of function on

function, to which we have drawn attention, is alone sufficient to render the cautions suggested in this chapter evidently reasonable ; and this is enough for our purpose, though the harmonizing and regulating functions of the nervous system, to those who have an adequate conception of it, might carry a stronger conviction of the importance of the advice we have offered.

It is very possible, through this kind of agency, that the penalty of improvident misuse of power is often eventually paid by some organ that has borne no part in provoking it ; for example, when overwork of the intellectual brain leads to paralysis of those portions of the cerebral mass which are concerned in exciting voluntary movements ; or disturbance and disease of the liver follow too much mental labour. The practical use which is to be made of these intimations is, to remember that a state of exhaustion, whether we call it exhaustion of the nervous system, or characterize it in other words, may issue in mischief to whatever organ of the body is most prone to disease, and hardly any individual is free from some such organic liability, either induced or inherited. In one family, the lungs, in another, the liver is the weak point, and ill health, however it may be brought on, is likely to show itself in some malady of the predisposed organ. Nothing can well be more important to recollect than this, especially by those who have the charge of the health of children.

By avoiding whatever depresses the vital powers, the liability may remain dormant.

Even when it has begun to manifest itself, it may again be rendered latent by suspending the causes of depression. Disease of the lungs, when it is threatened in young people whose nervous energies have been exorbitantly taxed, may be warded off by a change of system, involving all the repose of body and mind which is consistent with health. Attention is too generally absorbed about the exciting causes, such as catching cold, as it is termed. This is right, but the wiser aim would be to remove the predisposition.

The mere suspension of mental labour, when it is habitually severe, or, if that cannot be, a great diminution of it, is often seen to have a most beneficial effect when the symptoms of organic ill health make their appearance in grown people, even when this is the only alteration which is made in the mode of life. If the habits have been sedentary, and the disorder of the health is due quite as much to neglect of exercise in the open air, as to over employment of the brain, the walking excursion, which releases the mind, and employs all the energies on the muscular system and the organs of nutrition, is an excellent method of cure. But if the exhaustion be general, the repose should be so likewise, and the holiday should be spent in some form of interesting idleness, both of muscles and mind, or the remedy may only aggravate what it was intended to remove.

The consequences of an over-crowded labour market show themselves in all classes of society. There are too many in each trade, too many in

each profession, for any to be well off who cannot create a greater demand for what they either do, sell, or produce, than is enjoyed by their neighbours ; and hence every path of life has become a crowded course of competition and rivalry. This may be for the advantage of what is called the public, though, perhaps, not for any one of its members. One result seems to be, that there are a greater number of diseases which are referable to exhausted power now than there used to be. The man who, in the last generation, would have died of apoplexy, from eating too much and doing too little, is now, at a much earlier age, rendered useless by some disease of the heart or the nervous system, brought on by the rate at which he has been taxing his energies. We have nothing to do with the political economy of the matter, but this state of things requires that public and individual health should be advanced in proportion to the increased occasions of disease. Greater care and more precautions are demanded of each one, than would have sufficed to keep his grandfather in good health.

It is a common mistake to regard loss of health as inevitable, when it is owing to the strenuous prosecution of stated duties. There is certainly no such necessity in the great majority of cases, where the object sought is something very much beyond a bare subsistence. It would only be cruel to advise a poor needle-woman not to do too much for her health, when the most incessant toil only suffices to keep body and soul together. But most people are

really more at their own disposal; and that which is obliged to be done at last, and perhaps with little advantage, might just as well have been done at the first warning, when it would have answered its purpose. The introduction of a professional or mercantile partner, by dividing the labour and anxiety, might often rescue some overworked principal from ending his days as a helpless paralytic. But any such necessity might often be averted by limiting the ambition, contracting the engagements, or changing the occupation.

Still, when health and life are threatened, it is plainly a duty paramount to all others, to make whatever sacrifice is necessary to their preservation. In many instances, perhaps all that is really required is better management and a wiser mode of encountering the daily task. To begin the business of the day so as to have the start of the world, prevents one source of expenditure of power, which must be incurred when duties tread on each other's heels. Arrangement, method, punctuality, and zeal, save wear and tear of spirits, and enable the most busy to get through their labours with less fatigue. One class of the community, the Society of Friends, may be thought to illustrate, in a marked degree, the physical advantages of these and many other virtues.

Moreover, man is not intended to be always at work. One of his duties is to give himself the rest which his powers require. This need not be, and had better not be absolute inaction. Just as we may relieve our muscles by changing

the mode of exerting them, we may recruit the fatigued mind, by changing the subject of thought. And for this end it is useful to have some pursuits which are not obligatory—some tastes which can be innocently indulged in the periods when actual duties are intermitted. Positive vacuity of mind is not possible to man. Something will occupy his attention, and the veriest hobby that can be mounted is serviceable, if it fills up time with amusement, that would otherwise have been spent in profitless brooding over the crook in the lot. In general, the man who does not make it one of his objects to secure a rational amount of rest and recreation, does not accomplish more than other people, but rather less. Few will do cheerfully and with all their might, what they are never released from. And when leisure for innocent delight is only to be obtained by energy and promptitude, the resolution to enjoy becomes a most useful motive to exertion. The habitual indifference about securing some portions of time unmolested by the cares of life, which is sometimes seen, has many origins. There are men who take pleasure in the thought of what they call “dying in harness.” They are generally found amongst those whom society can least afford to lose. It is a very difficult piece of casuistry to determine when a man has the right of shortening his term of useful labour by making its severity excessive. In another kind of character, not so rare as to need no notice, the neglect of proper recreation seems to spring from a settled deter-

mination to maintain an excuse for being discontented.

We all possess in perfection the power of turning our attention off what we do not wish to think about; yet how much unprofitable fatigue and depression is incurred by forgetting that there is a time for all things, and carrying the anxieties of the business or profession into the hours nominally given to repose! It may be questioned, whether this pernicious carefulness, which keeps the spirits always on the stretch, ever leads to the solution of a single perplexity. The period of fatigue is not that in which the right course to pursue, or the right remedy to employ, is most likely to occur to the mind. The difficulty and dilemma which has harassed and oppressed us over-night, is often easily met and overcome, by the recruited powers in the morning. And even if no reason could be assigned to show the folly of making the evil of the day more than sufficient for it, the Christian may be sure that what is expressly forbidden cannot be wise. The late Mr. Hey, of Leeds, whose professional labours were as great and as conscientiously performed as those of any man, used to attribute his long enjoyment of life and health, to the habit of dismissing from his mind all interest about his patients, when the clock struck eight.

The institution of the sabbath is designed for the physical, as well as for the religious well-being of mankind. That periodical intermission of labour is necessary, both to man and the animals which he employs, has been

abundantly proved. If the writer's recollection does not mislead him, the abolition of the sabbath was found not to answer during the first revolution in France, and the cessation of labour (every tenth day) was again enjoined by law ; and to get the full benefit of Sunday, only in respect to health, the world and its duties should be left just as they were on Saturday night, not to occupy the attention again until Monday morning. There are often strong temptations to make seven days out of the week, and they are seldom resisted without religious principle. The lamentable self-destruction of a great and amiable lawyer was ascribed by the late Mr. Wilberforce, and perhaps with reason, to the practice of working on Sundays. There can be no doubt that the mental malady which in that case led to suicide, was the effect of exhausted nervous system.

One of the common accompaniments of such a state is the presence of bodily sensations of a depressing character. These suggest to the mind whatever in the actual circumstances may seem to justify and account for them. Many persons must have had opportunity of observing something like this in their own experience. When under the influence of indisposition, a good night's rest or a dose of medicine restores hope and energy, and the dark and gloomy views of life are dispelled by the removal of the physical sensations which occasioned them. But the cause may be in the brain itself, the very seat of sensation, and in

that case, the bodily feelings which attend the apprehension of evil, either present or imminent, are habitual and constant, and the faculty of association will be constantly raising before the mind all manner of real, and a still greater abundance of imaginary explanations. In such cases, there is always one real moral cause of depression, in the consciousness of growing more and more unfit for the duties of the station, and gloomy irritability may at last deepen into angry despair. But without this, the state of things we refer to has a tendency to issue in mental hallucination, and fancy completely dethrones the reason. Whatever may be thought of the explanation, insanity, in one or other of its many forms, is one of the liabilities incurred by not complying with the physical conditions under which we enjoy the possession of all our various capacities, both of mind and body.

Healthy sleep is the perfect rest and inaction of the brain, and, therefore, of every function that implies consciousness. It consequently draws with it the repose of the voluntary muscles, and the cessation of almost every other mode of expenditure, while it leaves the involuntary functions, which nourish the frame and repair the waste of the tissues, under the circumstances most favourable to their activity. This is what constitutes sleep the great "foster-nurse of nature."

This capacity on the part of the brain, of periodically lapsing into complete oblivion by the cessation of its functions, is to be regarded as one of its vital endowments, and as much a

proof of health as any of its active manifestations. The due enjoyment of the blessing is the consequence of a healthy condition of body. Some departure from the state of health has been sustained, when what may be called the function of sleep is habitually interfered with. Sleep is a criterion and index by which we may determine whether we are in a safe condition of bodily health. If the power of sleeping has been lost, other evils are likely to happen, we may be assured. One of the principal means of keeping the whole organization from the incursions of disease has been obstructed, and some unquestionable evidence of local or general disease may be amongst the possible results.

Instead of confining attention to the various appliances and methods of provoking sleep night after night, the loss of it should be taken as a warning, either that the general course of the bodily functions is disordered, or that some one organ is already more or less morbidly affected. It may be true, and most frequently is, that no active medical treatment is required, but only a thorough reform of the habits of life, and a complete rectification of all the circumstances which are capable of affecting the health; and then, it may be hoped, that this small manual will suffice to guide the individual in a rational pursuit of sleep. But a sagacious medical examination of the case is the only way to ascertain this.

The perfection of sleep is to sink into complete unconsciousness at once, and to remain so for such a length of time as may be necessary

to recruit the powers, and then to awake spontaneously. Nature has a tendency to do the same thing at equal intervals, if we afford it the opportunity. This is certainly the case with sleep to a remarkable extent. In the occupation of baking pipes, it is necessary to tend the furnace at least every fifteen minutes, and the men who perform the duty awake to put on coals, and resume their sleep again all through the night, and, as it appears, without suffering from this interrupted kind of repose. If this be possible, how much more may we expect to form the habit of sleep by preserving regularity in the periods of inviting it! The length of time that ought to be spent in sleep by each individual is by no means an insoluble problem. Supposing that the person is in reasonably good health, a fortnight's observation will determine how much sleep he requires to keep him so. He has only to get up resolutely every morning as soon as he awakes. If he has been awakened too soon on Monday, his body will compensate itself the next morning. The average of fourteen such experiments may fairly be set down as the number of hours' sleep really needed by that individual, and he may regulate himself accordingly.

The habit of excessive sleep, beyond the actual wants of the system, can also be formed, perhaps by sheer sloth, or by the wish to prolong unconsciousness of the sorrows and cares of life. This sort of sleep enervates the bodily functions, and unstrings the spirits, and the last effect is due quite as much to the physical

torpor and relaxation induced, as to the sense of dissatisfaction with one's-self which the indulgence entails. Even when something has really broken the rest, it is better to make it up to the system, by a short surrender to sleep in the after part of the day, than to take out the time by remaining in bed. There are people of very inactive habits both of body and mind, but of strong constitutions, (that is, of vigorous organization,) who seem to resist the effects of an unhealthy mode of life, and to retain the privilege of sleep unimpaired. As they can seldom be called wide awake, they find it easier to cultivate the power of going to sleep. Easy circumstances, fulness of diet, and abundance of idleness, and the resolution not to be troubled about anything either personal or relative, may bring human existence into a close resemblance to that of some animals. The vacant mind passes easily into unconsciousness. But sleep in excess does not invigorate. It loses its proper nature, and approximates to that of lethargy. The functions of the mind, and all its susceptibilities of thought and feeling, become blunted, and the material of digested food, instead of being consumed in functional activity, only serves to clog the system and disfigure the body by accumulations of fat. In such cases, the less sleep that is really required, the more is taken, and a beneficent provision is made to produce an effect exactly the opposite to its proper intent.

But while there are many people who injure themselves by too much sleep, there are some

others who require to be reminded of the necessity of taking enough. Many motives, some of them very praiseworthy, may engage the young and the energetic in a foolish contest with nature in this respect. A current maxim, or a case plainly exceptional, is quoted to justify the spare allowance of sleep. When it is not intended to make it the rule of the whole life, but is only resorted to in the hope of accomplishing some great purpose, there is nothing gained by it. Two hours' work, when the powers are vigorous and elastic, is worth treble the time obtained by green tea and cold towels wrapped about the head, or even by the resolute will to go on in spite of fatigue. Nature will be sure to revenge the wrong, by making the waking time worth very little, or compelling a complete loss of time in indisposition or illness. The habitual infringement of its claims to repose, only deprives us of spirits and alacrity, and lays the foundation for evils of mind and body, which involve serious consequences to health and capacity for exertion in after life. The method we have recommended is the only safe way of ascertaining what amount of time a sensible and conscientious person ought to devote to sleep. The hours are well spent in sleep which bestow energy and hopefulness on those given to study or business.

The chief prerequisites to the enjoyment of sleep, are sufficient activity of the voluntary powers during the day, a state of body and mind which does not occasion painful or uneasy

sensations, and an equal circulation. The first creates the physical necessity, the second removes obstacles, and the third allows the blood-vessels of the brain to be in that precise condition in which natural sleep is possible.

The imperfections of the state are well known, and consist in various forms of restlessness, up to absolute inability to sleep at all ; or in dreaming, which shows that the mental faculties have not partaken of repose. In proportion to the imperfection of sleep, we wake with a feeling of weariness, which may be greater than was experienced at lying down.

The best sleep is procured by deserving it ; but so essential is it to life, that merely to live, however little is really accomplished by either mind or body, makes it necessary to sleep. Still, there is a wholesome degree of weariness which, as everybody knows, favours its approach ; and many people suffer tedium at night only because they have contrived to endure it all day.

If the muscular system has been over-exerted, there will be aching of the limbs, excitement of the circulation, and a sense of fatigue, which effectually prevent sleep. If the mind has been too much absorbed in thought or emotion, the very organ in which sleep occurs, namely, the brain, will be incapacitated for the reason just mentioned. If the stomach be oppressed by the quantity or quality of the food which remains in it at bed-time, the attendant sensations keep the brain awake ; and the same effect follows difficult and im-

perfect assimilation in the further stages of the process. In either case, uneasy sensations render the sleep imperfect or partial, and suggest images to the mind in conformity with the bodily feelings, as in dreaming. When the irritation suffered by the lining membrane of the alimentary passages is reflected from the nervous centres to the apparatus of breathing, it often suspends its movements, and the state called nightmare is the consequence. If too long a period has elapsed since nourishment was taken, the uneasiness of the stomach, which we have elsewhere seen is the index to the wants of the system, will be quite sufficient to make sleep impossible. Very little common sense will determine, whether it is the late supper, or the lack of any supper at all, which produces the restless night. A state of inaction from want of food is one, though only one, of the causes which make the powers of the circulation run down, and produce that inequality in the distribution of the blood which prevents sleep. The light and warm refection of a basin of gruel or arrowroot, will innocently appease the stomach while it forces the circulation, and makes the hands and feet of the same temperature as the rest of the body.

People whose circulation is habitually languid, are very prone to suffer from unequal distribution of blood, and then the brief use of a hot foot-bath, or the presence of the hot water-bottle in the bed, restores the balance, and sleep quickly takes place. In more robust constitutions, a tumbler of cold water, rapidly

swallowed, by the reaction it induces, accomplishes the same end, and more salutarily. Chilled feet and legs are very common effects of prolonging the excitement of the brain in late studies. A hot foot-bath will often remove both causes of sleeplessness—the vascular excitement of the head and the discomfort of the extremities.

But the true wisdom is to throw the mind off any subject which is found to engage it too closely, for some time before retiring to bed. It can be done, even when it is the cares and anxieties of life, the worst foes to sleep, which have to be dismissed. And it is a point of duty to do so, if we frustrate the means of encountering them with restored energies by neglecting it. It proves and also contributes to the strength of the mind, to have its thoughts thus under control. The duke of Wellington slept on the field of Quatre Bras, in the heat of the battle, with the *Sun* newspaper over his face to keep the light from his eyes. When much fatigue is to be undergone, especially in times of anxious and sorrowful excitement, the greatest benefit and relief is at once experienced from even a very short sleep. A few minutes of unconsciousness will make an immense alteration in the capacity either to do or to sustain.

Too high a temperature of the body hinders sleep, and therefore feather beds and superabundance of blankets are to be avoided. The removal of a thick and heavy quilt, which both retains heat and prevents transpiration, is frequently all that is needed to cure restlessness.

CHAPTER VIII.

ON SOME MENTAL AND MORAL CAUSES OF DISEASE
AND ILL HEALTH.

RECIPROCAL INFLUENCE OF MIND AND BODY—BENEFITS AND LIABILITIES INVOLVED IN IT—BODILY EFFECTS OF MENTAL FEELINGS—MOTIVES FOUNDED THEREON—MORBID ATTENTION—FANCIED ILLNESS—MALADIES VOLUNTARILY INDUCED—HOW DISTINGUISHED—MENTAL EFFECTS OF BODILY FEELINGS—ARTIFICIAL MODES OF ACTING ON MIND—TO WHAT EXTENT ADMISSIBLE—WHEN EXCESSIVE—PHYSICAL CONSEQUENCES.

THROUGHOUT the whole course of this volume, we have been unavoidably precluded from dwelling on the countless benefits which result from the laws under which we hold our physical being. We have necessarily been confined to pointing out the danger of trying to live as if they could be neglected or defied with impunity. And the same restriction must be observed in the present division of our subject. More must be said about pains and penalties than about the rewards of obedience. Yet no order of facts could be more fertile in proving the wisdom and benevolence of God, than those which illustrate the nature of the union between body and mind, and the reciprocal influence which they exert on each other.

However wonderful it may seem when we

think about it, we do consist of a body and a mind, and the relations which obtain between them are so essential, that we must imagine all the conditions of existence different from what we find them, to imagine this intimate association in any respect annulled. If the mind could not suffer with the body, neither would it be capable of all the benefits which it enjoys from the connexion. And if the body could not suffer with the mind, neither could it be the servant and ally of the spirit, as it was intended to be. Both are fallen from their original perfection, as we see by the evils each incurs on the other's account. But provision has been made for both being redeemed. And even in their present state, more of good than evil results from that inseparable union and identity of interests, which appears the more complete and undeniable the more it is investigated. It is only the few who suffer, while the great majority enjoy ; and of the small minority how few suffer, except at intervals, and but for a small part of their whole lives ! And this is sufficient to allay any uneasy feeling, as if the reactions, sympathies, and reciprocal influences which bind together our material and immaterial parts, only tended to involve us in a vicious circle of evil consequences, from which there is no escape, since moral and physical suffering mutually produce each other. The true and wiser view is, to see in all this a benevolent provision to make the mind and body fellow-helpers of each other's well-being. The prosperity of each has been put, to a great

extent, within our own power. It is hoped that this truth has received some illustration in the present volume, as far as the body is concerned, otherwise it would be lost labour indeed to recommend the cultivation of health; and a volume equally useful might be written, to prove to how great a degree many forms of insanity might be averted or controlled by self-control, and the right choice of motives. The body is liable to diseases which no care could have averted, and the manifestations of mind are, without question, often disordered and obscured by conditions of the brain, for which no one in his senses would think of blaming its unfortunate possessor. Our pages do not treat of such cases, for advice is inapplicable when responsibility has ceased.

We wish it, then, to be understood, that we leave out of view all aberrations of thought and feeling which can be supposed to depend on disease of the corporeal organ of the mind, and limit ourselves solely to the consideration of those reactions of disturbance, between bodily and mental states, which admit of cure and prevention, and come plainly within the province of duty. The reader, it is hoped, will meet with nothing to discourage or to undermine the sense of responsibility in the facts we have to maintain. The only rational use of such knowledge is to make us more careful, on the one hand, to preserve our bodily health, lest we should suffer in our mental health as a consequence; and, on the other hand, to regulate our thoughts and feelings, so as not to impair

our bodily constitution, or set up physical obstacles to our mental and moral well-being.

The facts, therefore, to which we have now to draw attention, do not necessarily imply that the brain is not perfectly healthy. On the contrary, it would be idle to suppose it otherwise, unless it were true that no man could be the subject of a single immoderate feeling or passion, without some disease of his brain, which would stamp mankind as universally insane, and really justify the enormous error, so prevalent just at present, of thinking great crimes only the proof of great madness. Still, as the brain is the organ which is necessary to all manifestations of consciousness, if we find our bodily functions can be influenced by states of thought and feeling in the mind, it must be owing to some effect which is transmitted from the brain to the other organs by the agency of nerves.

The specific effects of feeling, emotion, and passion, to which we are about to refer, are, of course, over and above that general one of exhaustion, which we have more than once mentioned. It is demonstrable that emotion consumes the brain itself, even more than the severest thought, for the substances which compose its structures appear in the excretions of the body in very unusual quantities during periods of excited feelings. Besides the injury to all the functions of repair which results from irritated and exhausted nervous system, the habitual prevalence of emotion expends the material which is required for the general sustentation of the body, and affords an additional

reason why the prosperous, the placid, the happy, or the indifferent, are generally the best nourished; whereas the dejected, the anxious, the mourner, the repining, the disappointed, and all those who have not learned how to possess a source of central calm amidst all the endless agitations of human life, are almost always more or less emaciated.

We cannot, of course, do more than offer a few proofs that emotion has specific effects on the bodily economy; they will be sufficient to enable the reader to perceive the fact and the obligations it imposes. These effects are very various on organ and function; they excite, modify, and suspend the contraction of muscular tissues, and exercise influences of divers kinds on the general circulation, or on that of particular organs; and in this way stop, increase, or alter the processes performed by their tissues. Perhaps all the various physical consequences of mental feeling are to be referred to the power exerted, through the nerves, of modifying the contractile tissues. But, without attempting a classification, we shall only present a catalogue of some of the effects most commonly observed.

That some feelings of the mind inject particular tissues with blood, while others have the opposite effect, is proved by the crimson blush of shame, and the paleness of fear or rage. Terror causes the limbs to tremble and the teeth to chatter, by its effects on the voluntary muscles. Sudden or extreme emotion of any kind will kill, by completely paralyzing the

heart; and less degrees of agitating feeling cause it to throb, to intermit, or to beat with tumultuous rapidity. The apprehension of good, either present or expected, gives force and regularity to its pulsations; whereas, sorrow and dejection exercise a depressing influence on its action, and give rise to many of the sensations with which, under the familiar name of "sinking," everyone must be acquainted. The same liability to be affected by emotion, is shown by the muscles of respiration, in the sighing of grief, the quick breathing of fear and suspense, or in the temporary stopping of the function by surprise and consternation.

Some of the effects of mental feelings on vital processes, are so frequently manifested, as to give us good reason to think them only examples of what takes place from similar causes in recesses of the body which are not open to observation. The dry mouth of anxiety is, most likely, only an accompaniment of the same state of arrested secretion in the stomach, which we formerly saw produced the inability either to eat or digest. The flow of tears, on the contrary, exhibits the equally instantaneous activity of secretion which may attend the presence of emotion. Anger is thought to increase the bile, but that and other affections may contract the channels through which the fluid makes its escape from the liver, and so cause jaundice.

The secretion of milk presents the best opportunities for studying the effects of passion and feeling on mere organic processes. Its

flow is promoted by the affectionate desire to nourish the child, or suppressed by the sorrowful emotions. Some of the disturbing passions alter the constitution of the fluid. Great mental depression, or a fit of anger, will sometimes make it poisonous, and the child dies in convulsions soon after quitting the breast. Many very striking instances of this kind have been recorded. The saliva formed in rage, both in animals and in human beings, becomes possessed of properties which do not ordinarily belong to it; indeed, we might multiply instances of the organic and functional effects of mental feelings, till we had occupied the remainder of the volume. It is true that most of the examples we have given, are drawn from what happens on great occasions of excited feeling, which, for the most part, take us unawares, and cannot be helped; but the same affections which, in their excess, and under the name of passions, produce such obvious corporeal effects in their lesser manifestations, give character to the more lasting and habitual state of feeling. If the brief paroxysm exerts an influence which may even be fatal, what must be the effect of causes similar in their nature, though of lower degree, that operate constantly? The building may yield to the perpetual current, as surely as it is overthrown by the sudden flood.

Very few people, to take one instance, have their lives cut short by an overwhelming sorrow, compared with the number who pine and waste under a chronic grief. Diseases of

all sorts, besides those which have their seat in the brain itself, are amongst the direct or the ultimate consequences of all the mental feelings which render their subjects *unhappy*. Impaired digestion, mal-assimilation of food, depravation of the blood, a debilitated heart, irritation or exhaustion of the great nervous centres, with all the maladies which follow in their train, often have no other primary cause. The physician learns to suspect some rooted sorrow or deep-written trouble, when illness does not yield kindly to medical treatment. If it were required to support this position, that a well-ordered mind, the government of the feelings, and all that fortifies the bosom against the foes of peace, do really contribute very directly to preserve the health, it would only be necessary to quote the book of Proverbs, "A sound heart is the life of the flesh : but envy the rottenness of the bones ;" "A merry heart doeth good like a medicine : but a broken spirit drieth the bones," Prov. xiv. 30 ; xvii. 22. The spirit of these declarations is conformable to what we discover by observation, that, as a general rule, the virtuous sentiments are friendly to health, while those of the unbenevolent class, and those which weaken our moral power, are both of them unfavourable to bodily well-being.

Are people, then, to be good and wise, to refuse to suffer at all from evil passions, and to keep even the best under control, for the sake of their bodily health ? No one in his senses would very sanguinely expect it. Nevertheless.

there are many who would be put on some determined efforts to govern their tempers and their feelings, if they distinctly recognised the physical harm done by yielding to them. It is by no means part of the intention of those who are perpetually thinking they "do well to be angry," or of others who spend their lives under the irritation of envious and fretful discontent, to make themselves ill, or even liable to illness. Many are culpably willing to be miserable, who would not like to be dyspeptic, or to engender disease of the heart, or to bring on early paralysis; and if they were convinced that they were courting bodily sufferings by courting vexation of spirit, some, at least, might be disposed to welcome moral medicines which they now permit themselves to repel, or withdraw from the verge of temptations which they could not resist; and what was commenced out of mere prudence, would certainly raise them to a higher level, and more within reach of higher motives, to which they had previously kept their ears closed.

How many commit a species of slow suicide by fostering the depressing emotions! For it must be confessed, that a very large proportion of the sufferings that occupy human life are not so often inflicted as voluntarily entertained. The pains of memory are prolonged far beyond what serves any good purpose, and griefs are nursed that had better be forgotten. How many refuse to be comforted, or to let any consideration withdraw their minds from what they are resolved to deplore! How many pass their

whole lives in fear of a thousand things which may never happen, and never do happen ! The degree to which we are acted on by positively distressing events, depends more on our own wills than we are disposed to confess. We need not take refuge in stoicism or selfish indifference to escape the other extreme. There is sometimes a luxury, and often a very becoming propriety in grief, and the gentler sex, especially, think themselves justified in seeking the relief of tears, which often means a passive yielding to emotion which never yet did anybody good. The faculty of crying can be cultivated to great perfection, and is most pernicious and enfeebling to mind and body. Whether it arise from sympathy, or from solid personal calamities, sorrow should and can be moderated. But the chronic excess which is most enervating is, perhaps, chiefly occasioned by brooding and self-pity. Nothing is further from the writer's intention than to speak unfeelingly of the numerous class whose lives are passed with very scanty measure of the outward material of happiness, and who, if they have it at all, must get it from within themselves. But the effects are the same, however excusable the habit of "giving way" may appear to be.

We have written as if it were possible, by the mere force of will, directed by good sense, to secure a great exemption from the moral causes of ill health ; and nothing is more true. Both the quality and the degree of our feelings are put very much in our power. We may allow the mind to be wholly occupied and

absorbed by what pains and annoys it, or we may refuse. A taste for laudable reading, and the capacity of being interested about things rather than persons ; and, better still, the desire to do good and to make others happy, or the wholesome distractions of duty, will, in this point of view, be of the greatest service to health. It is the vacant mind that falls the easiest prey. To live for a good object is to be clad in armour.

But we are not left to contend against unhappiness by mere fortitude and good sense, though nothing can be done without them. The world is full of temptations and distresses, which need the sovereign antidote of confiding love to God as a Saviour in Christ Jesus, and a resulting unconditional acquiescence in his will. Half the things which vex human existence would find the heart insensible to their natural effect, if it were fixed in the belief that God is a Father to all who truly believe in Jesus Christ ; that all things are open to his eyes, and nothing can happen without his permission, seeing that the very hairs of the head are all numbered, and not a sparrow falls to the ground without him ; and that for every faithful soul there is "an inheritance incorruptible, and undefiled, and that fadeth not away, reserved in heaven," 1 Pet. i. 4. With such a belief, a man can afford to forget delights that time could never restore, to forgive injuries that could never be retrieved, and to deny all affections that did not harmonize with so great a hope. And the residue of unhappiness which might remain after all other sources had been dried up, from the pressure

of care, bereavements, loss of substance, and all the difficulties and trials of life whatsoever, would assume an altered and bearable aspect from the different interpretation that would be put upon them, as opportunities of proving the loyalty and sincerity of his faith. This would be the true philosopher's stone, that would turn everything into gold ; and this is really what is offered by the revelation which has been made to suffering humanity, as exhibited in the words of Scripture : " God so loved the world, that he gave his only begotten Son, that whosoever believeth in him should not perish, but have everlasting life," John iii. 16 ; " Therefore being justified by faith, we have peace with God through our Lord Jesus Christ," Rom. v. 1 ; and " as many as received him, to them gave he power to become the sons of God, even to them that believe on his name," John i. 12 ; " If children, then heirs ;" " He that spared not his own Son, but delivered him up for us all, how shall he not with him also freely give us all things ;" and " all things work together for good to them that love God," Rom. viii. 17, 32, 28 ; " Be careful for nothing," Phil. iv. 6 ; " Casting all your care upon him ; for he careth for you," 1 Pet. v. 7.

But it is not necessary to transcribe any more from a book which is accessible to all. No one who gives a moment's thought to such passages can deny, that they furnish both the obligation and the motive to a cheerful subjection of the will, both in acting and enduring, to the will of God. And if the consequent tran-

quillity of mind be favourable to bodily health, as nobody can doubt that it is, there can be no inhumanity in attempting to impress the fact that health is injured, and life itself put in peril, by whatever seriously and habitually disturbs the peace of the mind; for the remedy is open to all.

Dr. Holland, in his *Medical Notes and Reflections*, has drawn together many exemplifications of what may be the effects of directing the consciousness on the bodily organs. In this way, quite independently of emotion, the action of the heart, or the movements of respiration, may be quickened or disturbed—the act of swallowing rendered difficult—a sense of weight, uneasiness, and oppression produced in the stomach, and the digestion of its contents impeded—a feeling of restlessness or even cramp brought on in the limbs—tension and distress developed in the head, with confusion of thought, and the possibility of a hundred undesirable symptoms affecting the nervous system, as we see in the phenomena attributed to mesmerism. Thus, the hypochondriac patient, “in fixing his consciousness with morbid intentness on certain organs, creates not merely disordered sensation, but also disordered action in them.”

Such facts—and the catalogue might be greatly extended—go far to explain many of the symptoms of that condition, so curiously compounded of the real and the imaginary, which most frequently presents itself in the female sex, because the circumstances under which it may be expected, more frequently belong

to them than to men. Those who are ever inviting the exhilarating emotions of hope and self-approval, of whichever sex, are not likely to spend much thought on their bodily sensations, and will be saved from any pretext to do so, by the health which is one of the incidental rewards of a life of activity. But the position of some people enables them to be idle if they please, and in the absence of any real sources of care, the victim of *ennui* will have a thousand imaginary fears and anxieties to agitate and discompose the feelings; and these added to habits of obstinate inactivity of mind and body, are quite enough by their combined effects to destroy the feeling of health.

Various ailments, arising from unequal distribution of the blood, and its congestion in the vital organs, will soon make their appearance, and all manner of anomalous pains and sensations will occur, to rivet the patient to the belief that she is right in the very course of life to which she owes her complaints. In these circumstances, whether from the appetite for sympathy, or for the sake of the pleasure which is felt in being the object of solicitude, the pivot of every movement and the reason of every arrangement, or from the mastery which a long-cherished idea gains over the mind, the patient betrays a disposition to watch for symptoms which may justify the assertion of illness, and the reader can understand how many may either be discovered or created in the manner just indicated. A dangerous expertness in "working herself up," or giving way, is soon

developed. Palpitations, "most distressing headache," or sensations "which cannot be described," or some other complaints, which are real enough, but only due to morbid self-consciousness, are always turning up, to alarm her friends, and bring her unfortunate medical attendant to the end of his devices; and, in fact, just as the smallest object held close to the eye will occupy the whole field of vision, so the sense of very small pains will seem intolerable, when the whole consciousness is determinedly concentrated upon them. But everything is welcomed, even while it is deplored. Bad health is literally enjoyed. The resolve to maintain consistency becomes the ruling motive of the life. The mind is acute in all the reasoning which contributes to justify the persuasion of illness, and everything which contradicts it is put aside. It gathers up every item of evidence which seems to warrant what it wishes to believe, and is absolutely deaf to everything which can be urged in opposition. All the personal experience which refutes the cherished idea is disregarded; for if one complaint is relinquished, because palpable facts demonstrate that there is no physical reality to which it can be ascribed, another will be taken up in its place, and the belief of invalidism will be persevered in as though it had never sustained a single disproof.

Yet there is no lack of refutation. There is something in the very physiognomy, and in the tone and style in which the sufferings are complained of, which marks their real character

to a disinterested bystander. The symptoms have neither the antecedents, accompaniments, nor consequences of the genuine signs of disease, nor do they persist, or make their invasions in the inconvenient manner of real illness. It is not difficult to betray their victim into amusement, during which they are not heard of. They come on when the patient is doing nothing, or at the termination of the novel, or when the wishes are crossed; at dusk, or the last thing at night; or when asked to do something, which implies that there is no very serious illness. If no compliant doctor will give a name to what has so many local habitations, the title of a much more formidable set of maladies is usurped, and the patient is content with the polite fiction which tells her that her malady is on the nerves.

The proper view to take of such cases is a charitable one. These nervous complaints—"temper-diseases," as Dr. Marshall Hall calls them—develop themselves in all cases from the want of a worthy object to occupy the mind, and stimulate it to exertion. And the just ground for censure is, that this preliminary condition should have been allowed to exist. But they are well nigh incurable; at least, the cure involves a change of character, when the patient would cure herself, by changing the whole mode of her existence, inward and outward. The patient is much to be pitied, and so are her nearest and dearest friends. The most untiring sympathy, and the warmest affection, will intermit, or even be worn out,

when the case comes to be recognised as an inexcusable persistence in a course of selfishness.

Though not drawn from any one individual, a picture of such cases might be supposed to have its original in almost every circle of a certain class. The extent to which they prevail is well known to the medical profession, but a sense of honour, and a reasonable fear of the consequences, prevent their real nature from becoming part of the stock of general information. It would be well if it were otherwise; and it is in the faint hope of warning all whom it may concern against such modes of making the mind act in hostility to the body, that they are noticed in the present volume. Nor is such a case likely to go on, without some positive malady occurring, which is set down as the sign of a state, of which it is only the consequence.

In such cases as we have been referring to, the extreme immorality of intentional deception need not be suspected. But nothing is more certain, than that even this is often descended to from the same morbid desire of sympathy and notoriety. When such motives acquire the ascendant, they sometimes put their subjects on a perilous course of pathological experiments, and *they* find out, long before their friends are convinced of the fact, that the whole body is very much at the command of the will. Pain may be real or may be pretended; but attacks of convulsions carry conviction, and elicit the utmost sympathy at once. And yet medical men are aware that the power of inducing these at pleasure may be developed.

Mental emotion, independently of the will, produces muscular contractions. The most common exemplifications are found in the gestures, attitudes, and alterations of feature which, *on this account*, become the interpreters of mental feeling. Under the strong pressure of emotion, many unusual actions of muscles are witnessed, which seem, as we say, to relieve the tension of the nerves, and of these impassioned speakers exhibit abundant illustrations; and the genuine hysterical paroxysm generally supervenes on strong agitation of the feelings.

Bodily sensations are also the excitants of muscular contractions, equally without the intervention of the will, as we see when a novice takes a pinch of snuff, or when vomiting is brought on by certain things that disgust the nose or the palate, or when tickling produces involuntary, painful, and convulsive laughter. But neither in the case of emotional movements, nor in those which are immediately prompted by sensation, is the actual presence of the customary outward cause absolutely necessary, for the same effects will take place when the mental or bodily feeling is only recalled by thinking about what would naturally occasion it. Thus, the very act of vomiting may be produced by dwelling long enough on the idea of a repulsive object, and the breast will heave and sob at the sorrows and calamities detailed in a well-composed fiction.

The following case is quoted in Dr. Hecker's *Epidemics of the Middle Ages*: In the year 1787, a factory girl at Hodden, in Lancashire,

fell into an epileptic fit (?) from having a mouse put into her bosom. On the following day, three more girls were seized in the same manner. It began to be supposed that a fearful disease had been brought into the factory in a bale of cotton, and more of the workpeople were attacked. But this was not all. The report of these strange seizures spread, and other cases, of precisely similar kind, presented themselves in distant villages. In the first girl, we see that emotion was sufficient to induce convulsions and suspend consciousness for twenty-four hours. In the other cases, which occurred amongst her fellow workpeople, the imagination was assisted, perhaps, by seeing the first case, and also by the belief that they were affected by the contagion introduced in the bale of cotton. But in the individuals who were affected in situations remote from the original scene of these events, it was, most likely, pure imagination which produced the fits. It was not merely thinking about what had occurred to other people, which led to the attacks in the last-mentioned persons, for that the whole population of the district must have been doing. But they involuntarily invited the attack—not by making it the subject of speculation; not even, perhaps, by a belief of similar susceptibility to the imaginary disease; but simply by attempting, partly from dread and partly from morbid curiosity, to realize what had impressed their minds so strongly.

The records of the dancing mania—a species of convulsion which attended the frantic and

superstitious excitement which followed the terrible mortality of the black death in the Middle Ages; the curious affections of the nervous and muscular systems which were ascribed to the bite of the tarantula spider; the convulsions and loss of consciousness that so often present themselves under a certain kind of preaching; the propagation of epilepsy amongst the spectators of its attack—all offer similar examples of the extraordinary and anomalous states which may be induced by imaginative sympathy.

The essential circumstance is the attempt to realize what is witnessed or thought of. The thing may be greatly dreaded, but in foolish or weak-minded people this will only set the process more actively at work. We may easily think that the same effects which are thus induced by dreading lest they should happen, will take place with equal readiness by wishing that they may. The convulsive affections which signalized the early preaching of John Wesley, and, indeed, nearly all periods of strong religious excitement, have been mistaken for the tokens of a supernatural influence that could not be too ardently desired, and the wish to become the subject of such “operations” must have had a great deal to do with the event in a large proportion of cases.

Now, in the dishonest production of nervous and convulsive diseases, which it is the object of these remarks to render less frequent, by exposing the means employed to bring them on, the immoral motives before alluded to are

enhanced by the miserable ambition to deceive successfully. Some selfish and unconscientious person has discovered that she possesses what the doctors call a peculiar mobility of the nervous system, though she does not give it so learned a name; she only becomes aware of the fact. She has observed, that she had such and such sensations, or was the subject of certain agitating emotions, before she was seized with such and such symptoms. She thinks about them, and wishes they would come again, for the sake of the pity, the fuss, and the devotion of which they render her the object. As to the emotions, they are easily recalled, and she can always, if she takes pains, get a vivid recollection of the sensations, and the oftener she tries those experiments, the more readily she finds her system respond to her efforts; the tendency to convulsive movement becomes established, and the process which brings on the fit more and more simple, till at last it seems as if it were directly summoned by the will, for it appears when it is desired. But as such movements are not really voluntary, but only the effects of what may be voluntarily induced, they cannot be stopped by the will when they have commenced, even if the "poor sufferer" wished it, which she is far from doing. In fact, complete insensibility sometimes, not only seems to, but really does attend the seizure, which is still more satisfactory.

The writer has seen convulsive movements confined to one limb. The thigh-bone was jerked in and out of the socket of the hip-joint

with a loud snapping noise, and with incredible rapidity, for many hours together. This was only one of the many distressing affections which surrounded the bed of the young person with sympathizing friends and ministers of religion. Sometimes violent hiccough came on and lasted for two days, or she had symptoms which her friends mistook for dangerous attacks of croup, or inflammation of the bowels, and these were varied by fits of insensibility and general convulsions. However, her relatives allowed themselves to see the true nature of the case, and the girl was cured by the wholesome neglect which followed the exposure of her motives. Analogous instances fall under the notice of all medical men, and the primary and real cause of these mysterious affections can be detected by those who have opportunities of observing the circumstances under which the attacks take place. As motives of an unworthy and even vicious kind are really at the bottom of such trains of symptoms, they may be looked for under the precise circumstances and junctures when such motives are most likely to operate, and not often, if ever, at other times. If they proceeded from a real physical cause, this would evidently not be the case. Genuine nervous diseases do not single out individuals with blindly indulgent relatives, or those who are under no foreign control. Their symptoms do not wait for the presence of particular people, or only make their appearance at the most opportune times. Their victims are seized as often when alone, or in their beds, as when the

family circle or the social party is assembled. We repeat, that the criterion between the genuine and the spurious, is to be sought when there is any difficulty about it, in the patient's moral character, and in a shrewd comparison of the times and circumstances of seizure. The chief difficulty which the medical attendant has, in dealing with such cases, is the extreme immorality which they involve. He may see their true character and origin, but how is he to get the patient's friends to consent to take the same view? The only reward of attempting it, in most cases, would be his dismissal; and, if he continue to prescribe, he does it with a conviction that he is endorsing a forgery, and strengthening a malady which can only be cured by removing it altogether from the province of physic. The only thing to be done is to disseminate information, in a way that cannot be supposed to have any reference to particular persons. This we have attempted, however imperfectly, to do. Were the possibility and the rationale of such practices generally known, they would be less often engaged in than, it is certain, they are at present. They would be met at their outset, and effectually repressed by being promptly discountenanced. And the invidious task would not be imposed on the medical profession, but undertaken by the proper moral guardians of the patient. We have confined our observations to convulsive maladies, because of the general opinion that these carry with them the evidence of their own reality. We have endeavoured to show, what

no well-informed physician has a doubt of, that when they are real they are often not the less self-induced. But there is no doubt that such maladies, and a great many others, are often only pretended, or imitated with marvellous though not complete exactness, for mere imposture cannot produce so perfect a copy as to deceive a good medical judge, and of that any individual who may be inclined to make the attempt may be assured.

Some notice must now be taken of the reaction of the body on the mind. The whole subject is of deep and curious interest, but the object of the volume, and our limited space, will oblige us to confine ourselves to a few considerations which can be turned to a practical account. For this reason little will be said about the various ways in which positive insanity is often induced by organic and functional disease, either of the brain itself, or from its sympathy with other organs ; although it is unquestionably true, that amongst the advantages of bodily health is included a diminished liability to various forms of insanity. We have pointed out in a former chapter some of the ways in which the health of the brain may be directly impaired, how it must participate in the general organic health, and how the other organs of the body suffer by sympathy, or by consequence, when the brain suffers.

The mind seldom exists in a state of pure thought ; feelings almost constantly mingle in its operations. They attend every conception of personal good or evil, past, present, or to

come. The thought of evil—if produced by our own fault, raises remorse ; if by the fault of others, indignation. The thought of good excites the feeling of hope, if it is yet to happen ; of joy, if the mind apprehends it as already possessed ; and gratitude, if it is not the effect of our own acts ; and so on. When these conceptions are sufficiently vivid, the mind is moved, as we say ; that is, it becomes the subject of emotion, and then, if not before, bodily sensations always accompany its various affections ; the physical sensations being pleasurable or painful, according as the affections are stirred by what is regarded as a good, or by its contrary. The customary phrases in which strong emotions are described seem to be founded on this fact. People are said to pine with sorrow ; to sink in dismay ; to be prostrated with grief ; to be racked with suspense, to boil with anger, and swell with rage ; to be sick with deferred hope ; to be oppressed with anxiety ; to feel the cordial of hope. A happy event lifts a weight off the breast, and does the heart good ; while the thought of distress brings it into the mouth, and the prospect of evil makes it heavy. Hence, some have actually distributed the affections of the mind amongst the organs to which the sensations that attend them are referred ; making the heart, for instance, the seat of hope, joy, and fear ; the liver, of jealousy, etc. Whatever misconception this involves, it is matter of common experience, that when the mind is engaged by the thought of enjoying good or suffering evil, its feelings

will be mixed up with the consciousness of bodily sensations.

But the very same sensations which are thus produced by the moral affections, as they are termed, because they become the motives to action, and are themselves the objects of moral reasoning, may be excited by causes which are purely physical. This must be the reason of that constant dread of evil which often attends disease of the heart, before the real nature of his malady is discovered to the patient; and it explains how exhilaration of spirits is produced by muscular exercise, and why morbid irritability and depression of mind are often cured by medicine; how the mountain is turned into a molehill when the bodily energies are recruited; and gloom, and the inability to pursue thought, removed by remedies which send the blood a little faster to the brain; and how cheerful trains of thought and feeling seem to occur spontaneously when health is enjoyed. In like manner, the morbid fancies and groundless apprehensions of the dyspeptic hypochondriac are just the tincture which the current of his thoughts receives from his bodily sensations. And the fantastic horrors which beset the imperfect sleep of those who go to bed with their stomachs loaded with indigestible food, must be suggested to the mind by the consciousness of the precise sensations which would naturally attend the reality of what they only dream. Very possibly, a small dose of tartar emetic, *taken unawares*, just before the battle began, would go far to make cowards of the

bravest, for great fear has many of the same physical effects.

Without multiplying instances any further, we may say at once, that the feelings of the mind are, at the very least, inseparably connected with a certain order of bodily sensations; and that, as the very same sensations may be occasioned by what acts first on the body and not the mind, there arises great liability to mistake mere bodily sensations for the genuine feelings of the mind, and even to be content with the one in the stead of the other; like the drunkard, who, without one justifiable reason for cheerfulness, is fond of the "cheerful glass," which relieves him from irksome and depressing thought, though at the expense of his stomach, his liver, his brain, and his soul.

This leads us to consider the well-known class of agents which agree in this particular, that their action on the body induces agreeable effects on the mind, and on this account are called "artificial" stimuli, in opposition to the proper sources and occasions of mental strength and tranquillity. Alcohol, as it exists in wine, beer, or distilled spirits; opium, tobacco, and even tea and coffee, though by no means the only materials which can be used for this purpose, are those which are most commonly resorted to in this country, and the subsequent remarks will be confined to them.

It cannot be of much avail to denounce all recourse whatever to such means of affecting the mind through the body; we are not purely spiritual beings, and the mind can receive both

benefit and injury from what operates on its companion, and its susceptibility to "artificial" influences is very often a thing to be thankful for. Wine, one of the most potent of them all, is recognised in the Bible as a blessing. This alone would prove that there is a legitimate use to which this class of substances can be put, and that will never be injurious to health; for if it were, it would for that reason be immoral and to be avoided. What, then, are the circumstances which justify their employment, and should regulate its degree? It is right just so far as it ministers to the interests of health, energy, and virtue. The cases in which they can be rationally thought to have these desirable results are not so numerous as people suppose, but they are plentiful enough to show the error of indiscriminate prohibition, for there is nothing that cannot be abused by excess. *But the benefit is always firmly tied to moderation.* To employ them for the mere gratification of the sense of taste, or from idle bondage to habit, or with the simple and ultimate purpose of relying on them for pleasurable excitement of the mental feelings and capacities, are the most common occasions of excess. All three generally go together, but the last would appear to be the strongest incentive to intemperance, because of the well-known necessity to increase the dose to maintain the desired effect. In a former chapter, it was shown that any such methods of forcing the functions of the brain must prove fallacious in the long run, even if they did not sow the seeds of great phy-

sical mischief. And if the mind be disturbed or enfeebled by moral causes, the true remedies are to be found in the belief of what is true, and the doing of what is right. Even if the body be compelled to suffer through the mind, as it often is, still the cure to be worth having must commence on the source of the evil. In any such circumstances, to seek relief from stimulants which raise an unsubstantial happiness, or from narcotics which render the moral perceptions and powers dull and dormant, in proportion as they soothe and lull the feelings, must be considered to be amongst the greatest of criminal mistakes, even if there were no ulterior consequences, both bodily and mental, which it is plainly wrong to provoke. It is impossible to specify the exact circumstances under which it may be beneficial to take a moderate allowance of alcoholic stimulus, or to employ any artificial mode of acting on the mind. There are undoubtedly many cases of languor and depression which would disqualify for the discharge of duty, if it were not for the temperate excitement of the powers which is procured by wine or malt liquor. And some people must be allowed, without reproach, to allay excitement and compose their nerves, after the labours of the day, by the pipe or the cigar. If that be the object, a very few whiffs would answer the purpose, we should be disposed to think.

But with respect to every one of these artificial methods of acting on the mind, the proof of keeping within the bounds of prudence and duty in their employment, is to be sure that

it is carried no further than just enables the individual to make use of better remedies than artificial restoratives—and these are food, sleep, good counsel, true consolation, and virtuous resolve, and hope that is never long in coming to its assistance. If this limit be observed, there will be no danger of impairing either health of body or health of mind, for both will profit. Whether anything of the kind be really required, and how much will answer the purpose when they are at all advisable, every one must determine for himself. A wise man will use them with more caution in proportion to his apparent need of their influence. No worse guide can be listened to than inclination, and, in the absence of competent medical advice, which is often sought about points of far less importance, the reader must attend to the voice of conscientious good sense, and be quite sure that he does not deceive himself.

If any person employs them as substitutes for patience, or to drown the sense of what should be felt—if they incapacitate him for exertion, or in any degree tempt him to relieve the tedium or the misery of reality by the illusions of a happiness that is merely sensual—he must be distinctly aware of it, and that he is debasing his soul, even if he were not also on the way to destroy his body. As long as human nature retains its frailty, safety can only be found, with certainty, in entire abstinence from all artificial stimulants, and nothing will render this so easy as to be in good health, for then none of the practices we have been allud-

ing to will be really needed, unless the want is wilfully created by beginning to depend on them. The healthy can do best without them—to do without them is one great means of being healthy. Their tendency is always to excess, and excess will certainly destroy health; and the unhealthy will suffer most from their abuse.

The little already said would be quite sufficient to deter those who are really in earnest from misapplying any of the things we have grouped together. But as it may, perhaps, help to breed caution, and even incite to reform, a brief account will be given of the remote consequences which attend habitual intemperance in any of the indulgences now under consideration.

The moral consequences, such as loss of character and influence, of self-respect, temper, self-control, and capacity, must be left unnoticed for want of room. Indeed, the heaviest part of the punishment, in some of these respects, is the natural effect of having wilfully destroyed social value, by wilfully destroying health; and on this account it is that general blame and self-censure attend the same things which would otherwise invite pity, and be supported with patience.

To confine ourselves to the physical consequences, and to begin with those of alcohol, in its various forms of wine, malt liquor, and distilled spirits, we may say that alcohol acts directly on the lining of the stomach, and its habitual employment keeps this membrane in a state of irritation, verging on and frequently

amounting to inflammation ; and this is one of the ways in which it destroys digestion and appetite, and produces foetid breath, and a long train of deplorable evils, so that if it had no other mode of doing injury, this would be enough to impair health and usefulness, and even to shorten existence ; but it enters unchanged into the blood when taken in excess, and does not then undergo assimilation, if that ever happens. It may be smelt in the breath of drinkers, and is found plentifully in the vessels of the brain when death by apoplexy has followed complete intoxication ; all the structures of the body are thus exposed to its influence—to the disorder of their functions, and the depravation of their nutrition. Whenever there may be tendency to disease, that will be brought into fatal activity ; consumption, and all forms of the same complaint in other parts than the lungs, will proceed with accelerated pace, and the very matter of tubercular disease will be generated in greater abundance.

The heart is exposed to palpitation, enlargement, or ossification. The organs of elimination are especially sure to suffer. The liver of spirit-drinkers loses its natural structure, and becomes unfit for its proper function ; and the same may be said of the kidneys ; and the effects of diseases of these two organs, brought on by drinking, are very numerous and destructive to life, even when life is not terminated by disease in those organs themselves. The skin is disposed to erysipelas on the slightest injury, and even without such provocation, to say

nothing of the crop of pimples and masses of tuberculated growth that deform the face.

The power of recovery from wounds is greatly impaired; the most extensive and fatal diffused inflammation frequently following even the slightest accident. Every malign influence acts with tenfold certainty and effect on intemperate drinkers. In the last century, the deaths from fever, in London, fell off nearly one-half during the operation of certain acts of parliament, which were designed to discourage the distillation of gin. The brain and nervous system afford the most appalling and decisive proofs of the deleterious action of alcohol. Apoplexy, epilepsy, paralysis, and insanity, are more frequently brought on by habits of drinking than by any other cause whatever. More than half the inmates of public mad-houses are supposed to have qualified themselves for admission by this vice. Intoxication being nothing but short madness, it is not to be wondered at.

But when no such extreme penalty has to be paid, every faculty of the mind suffers a gradual tendency to extinction. That which at first excited its powers of thought and imagination, and seemed to lift the man above himself and his sorrows, ends in making him a degraded, dejected, useless incumbrance to himself and society. In short, there is no source of sin and misery to be compared with the sin of deliberately relying on the effects of artificial stimulus to influence the mind and feelings; and as the writer believes this to be the most common occasion of injuring health by drinking,

he has placed its consideration in the present chapter.

All this, and much more, may be said of the use of opium for the same purpose, which has long been prevalent in some parts of England, and is nowhere without its exemplifications. Its immediate effects are even more grateful than those of alcohol; and the subsequent depression which creates the seeming necessity to persevere, is also deeper and more certain. It is, therefore, nothing less than a deadly poison to mind and body; and the first dose, taken for the sake of enjoyment, is the voluntary putting on of the fetters of a slavery full of horrors and woes, and that nothing but a superhuman energy of will, never to be counted on, can ever shake off.

The effects of tobacco depend on an essential oil, which is one of the strongest narcotic poisons known. Like everything else, they are different according to the degree to which the nervous system is subjected to them, and we have felt it right to acknowledge that even tobacco may have some useful applications; thousands of people certainly do employ it without any disadvantage; but this is, almost universally, when the circumstances and habits of life are favourable to health. The more common evils of excess seem to be impaired digestion and general debility, from the waste of a vital fluid, the saliva; but this is only an occasional consequence. When, however, the system is kept under its influence, by the practice of inordinate smoking or chewing, it seems to be a

depressant in every sense of the word ; weakening the energies of the brain, the circulation, the muscular system, and every organic function, without exception. Its votary is pallid and spiritless, and carries the tokens of a bad habit of body ; so that sir James Clark justly charges the misuse of tobacco with being one of the most efficacious modes of inducing consumptive disease.

Tea and coffee are only beneficial when taken in moderation, for they resemble the substances with which we have classed them, in producing direct effects on the organ of the mind, and are often resorted to with this intention, and then, chiefly, there is danger of excess and injury to health ; therefore, their use must be regulated by precisely the same principles which were glanced at in a former page. Milk seems to sheathe their particles, and deprive them of at least part of their prejudicial action on the nervous system. When employed as an article of diet, much of the evil which is attributed to tea seems to depend on the introduction of an unwholesome quantity of fluid into the stomach. But thirst is the natural demand for dilution, and though it cannot be prudent to provoke it by the nature of the food, it can only be beneficial to allay it. If it is not felt, one cup, of reasonable strength, will be more advisable than three or four weak ones.

It would limit the utility of this volume were this chapter to enlarge, with fidelity, on some other forms of excess, which are pre-eminently sins against the body. It will be

sufficient, perhaps, for all those who are alive to moral considerations, to warn them against all pleasures which terminate in, and do not look beyond the gratification of present appetite for bodily sensation. We have seen, in respect to eating, that if the principal thing in view is the pleasure which attends it, the individual is on his way to form habits which will issue in bodily sufferings. But there are other appetites, that provoke more strongly and immediately the remonstrances of conscience ; and what we do most earnestly desire to impress on the mind of the reader is, that the disapproval of conscience, which has to be conquered before these are allowed full scope, is nothing short of a threat of most severe penalties, which will have to be endured in the present existence, in the deprivation of animal, organic, and moral energy, and very possibly in the conversion of the body from an instrument of virtuous and happy activity, into an apparatus of punishment and woe.

CHAPTER IX.

ON THE DUTY OF PRESERVING AND REGAINING
HEALTH.

THE EXTENT OF THE OBLIGATION—ITS GROUNDS—INDUCEMENTS—POPULAR ERRORS ABOUT THE CARE OF HEALTH.

THE practical mistakes about health range between two extremes. Some people think it a matter quite as much above them, as the vicissitudes of the atmosphere. They enjoy it when they have it, and lament when it is wanting. Others regard it as something only to be attained by thinking about nothing else. The first look upon positive illness as the only occasion when health should be studied; forgetting that to keep well, is the way to prevent illness. The second cultivate health as some people try to be virtuous, by a course of small scrupulosities and a perpetual fear of running into danger, and with similar ill success. For as the only virtue worth having is that which can resist temptation, so the only thing that deserves to be called health, is a state of body which gets good rather than harm from influences which cannot be escaped, without leading the life of a plant in a hothouse. We

have endeavoured to meet both these misconceptions.

To be in good health cannot absolutely be called a duty, for it is very often rendered impossible, both by inward and outward causes which cannot be helped. But no one will deny that it must be a duty to be as well as possible, and that it is for the most part quite possible to put in practice such principles of advice and caution, as those by which we have endeavoured to show the way to be in good health. And so far as this is done, it may be thought that most people would find it quite possible, and therefore an obvious duty to be well.

Health can no more be "made easy" than virtue. It is a state to be preserved and acquired by using the proper means, and their employment is well worth the trouble. Nor will it be irksome if undertaken with good will; and this will be inspired by a thorough conviction of the reasonableness and benefit of the means to be employed, and the cautions to be observed. Habit will come to the assistance of prudence, a sort of instinct will soon supersede the necessity of a painful punctiliousness, and a speedy enjoyment of reward will make perseverance easy.

The ordinary experience of mankind and the progress of science, have accumulated ample proof of what should be regarded as the essential requisites, both personal as well as outward and circumstantial, for prolonging life; and it is plainly a duty to become possessed of such information, and to apply it to the fullest prac-

ticable extent. To be willingly ignorant of it is folly; to neglect it when known, both folly and sin, inasmuch as it is the revelation of the conditions under which the blessings of health and long life are dispensed, and these will not be enjoyed if those are not obeyed; "for who can make that straight, which he hath made crooked?" Eccl. vii. 13. In the moral government of God, the physical as well as the moral well-being of his creatures has been placed, to a great extent, within their own control, and the care of the health is included in this state of probation. "The rules for preserving health, and recovering it when lost, are not only fallible and precarious, but very far from being exact," said bishop Butler, long ago, in treating of our probation in this life. But this kind of doubtfulness belongs to all the means by which our well-being is to be promoted, and in other respects than health, no reasonable man refuses to employ them on this account. The cases in which they do not secure their end, are only few and partial exceptions to those which prove that they are conducive to it. But these qualities of fallibility, precariousness, and inexactness, are not in the rules themselves. Their certainty has been established. Their precariousness depends on the number of counteractive forces, both moral and physical, which they have to surmount, and their inexactness arises from the difficulty of applying them to individual cases. If it were not for this, it would be a duty to die of old age, as it is plainly our duty to try for dis-

solution by the gentle way of natural decay ; for all our care about health resolves itself into postponing that death to which our organization constantly tends. Multitudes, it is true, must live in circumstances which render their life a slow kind of dying. And an equal number, who have no such excuse, pass through life shortening its duration and diminishing its usefulness, by not making it a duty to be as well as possible. Unavoidable ignorance can hardly any longer be pleaded in this country, and no man can refuse to make himself acquainted with the laws under which he holds his natural life without offending his conscience.

It is hoped that the preceding chapters have sufficiently shown that health is to be preserved, and its return invited when it has been lost, by a resolute perseverance in healthy habits, and by securing the outward condition upon which health depends. There will be great occasion for self-denial to master habits, tastes, and propensities, at war with the first, and for intelligent energy to provide the second, and therefore the rational pursuit of health deserves to be ranked high amongst the virtues, for it calls many into exercise. And it is in the great majority of cases, just because blind self-indulgence and indolent aversion to change an accustomed course are so natural to us, that so many try to atone for a general course of sins against health, by the occasional endurance of much privation and suffering in the way of medical treatment, preferring to do penance rather than to avoid doing wrong.

No fact has come out clearer from the study of the laws of health and longevity than this—that physical degradation and misery are, to a great extent, inconsistent with moral well-being. Man sinks in all the capacities of his nature when his circumstances are in a high degree unfavourable to his bodily health. The character of the species admits of being raised by everything which contributes to the extension of physical life; and it is liable to extreme deterioration when existence is rendered miserable. What has been proved to be true of communities and successive generations, may be thought to yield a strong motive to the care of health on the part of individuals.

Nevertheless, when health is at all considered in its moral bearings, it may be suspected that the prevailing opinion is at variance with this motive, because it is often seen that severe maladies seem to suppress some bad and undesirable qualities, to bring out traits of character which win esteem and kindness. There are an equal number of cases to be quoted, where the sick bed and chamber only afford scope for irritable ingratitude and violent impatience. Disease and ill health may constitute a salutary discipline, but not of their own proper nature. They are, as certainly, conditions of temptation. At any rate, no one ought to count on the improvement of his character from suffering pains and disabilities, from which a virtuous prudence or a well-informed good sense might have saved him. Sickness and apprehended death may make people think

and judge as they never did before, and may call into action moral excellences of a very high kind. In point of fact, and most frequently, the lesson most obviously taught is often least noted. And that lesson is, that we have been living contrary to the laws of our physical being ; or, in other words, pursuing a course which deprives our souls of the use of our bodies. The best explanation of most of the chronic illnesses which affect us, is to be found in the antecedents that have been operating upon us. And their cure is often most successfully conducted by a complete reformation of all those particulars in our conduct, habits, and circumstances, by which the bodily constitution has sustained injury.

It must be remembered, that much detriment to the higher and nobler purposes of life may be incurred, short of the positive illness which lays us by, and obliges us to look after our health. The constant suggestion of mental feelings by bodily sensations, which we spoke of in the last chapter, may induce a disposition to view the actual events and circumstances of life through a medium, which distorts and darkens their real aspect, and makes the sufferer the perpetual prey of anxiety, irritability, and a sense of difficulty. In no respect, either social, moral, or religious, is he what he would be, if his bodily sensations were such as belong to good health. Our bodies are part of ourselves. To think of them only as servants having no rights, is the way to convert them into despots. One very chief way of keeping under our

bodies, is to keep them free from uneasy sensations. When does the mind act most freely, or the moral powers most promptly obey the dictates of conscience? When does kindness most resemble an instinct? Everyone knows that it is not when the attention is occupied by a general sense of being unwell, or by the decomposing influence of positive pain. To be amiable and useful costs more effort at such times. This fact may and ought to lead us to judge an invalid very charitably. There are plenty of instances, where the victims of pain and languor have had nothing to do with inviting their attacks. But it ought to make us determine to save ourselves, as far as depends on ourselves, from the hindrances and temptations which the weakness of the flesh can put in the way of a willing spirit. It is better to bestow sympathy and consideration than to need them.

One more powerful reason for doing nothing against health, and everything for it, is the well-known fact, that constitutional diseases and tendencies to disease are transmitted to offspring; and what is more, that the history of the health of the parents, both father and mother, often becomes written on the successive children of a family.

It is a thing to be thankful for, that there are so many curative modes of acting on the bodily organization when it is the subject of disease. But the art of healing and the administration of medicines, is the smallest and least efficacious of the functions which the

medical profession is qualified to exercise. The science of preventing is both more important and more successful, it is beginning to be thought, than the science of curing. At present, this wider notion is only applied to communities ; but it is greatly to be desired, that individuals and families should enjoy the same advantage ; and it would only be just that they should pay for it, instead of grudging money to the doctor, except when it represents what they have had to endure at his hands in the shape of actual medical treatment.

But it will be a long time before the generality of people suffer medical advice, save under the compulsion of pain or the fear of dissolution. Indeed, not one in a thousand ever honestly follows it, even when it is thought to be most needed. Nothing is further from the idea of the writer, than to recommend that sort of constant reference to the physician, which springs from what may be called a superstitious reliance on medicine. The responsibility of superintending one's own health cannot be shifted on to a medical priesthood, and it is a privilege which should not be forfeited. But, considering the number of circumstances in personal constitution and position which have to be taken into the account, it would only be wise to avoid mistakes and fortify resolution, by getting our plan warranted by advice that can be relied on, for one invariable mode of proceeding is not adapted to everybody.

Medicines, for the most part, are only arti-

ficial methods of getting nature to do that which, when she has fair play, she will do better without their assistance; and unless there be some specific malady which really requires the resources of the medical art, the best purpose of seeking advice is to be directed how to do without it. To bring his patient to this point is the aim of every right-minded member of the profession. To be in constant need of the action of things which, every one of them, would injure the healthy, deserves itself to be thought a state of disease. If the writer of the foregoing chapters has in any degree succeeded in his object, he has placed before the reader some explanation of a better plan of preventing bad health, and, therefore, any of the particular signs of such a condition.

It is to be expected that this book will come under the eye of parents. Many of the principles it contains will be applicable in the physical education of children. But as childhood and youth are the most important periods of life in regard to health, as in all other respects, the writer would rather refer those who have the charge of the health of children to some of the numerous works specially devoted to that subject, such as the treatise of the late Dr. Combe, or the excellent manual of Dr. Bull, on "The Maternal Management of Children in Health and Disease."

In concluding this work, the author desires to say, that it has been his object to illustrate principles rather than to afford minute and particular precepts. If these have been laid

down with sufficient clearness, of which the reader must judge for himself, their application will not be difficult in cases left unspecified in the volume. At any rate, there has not been room for more than he has said ; and he entertains the belief that he has said enough to guide any one in the rational promotion of health.







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